A Dissertation on

A CLINICAL STUDY OF DIAGNOSTIC HYSTEROLAPAROSCOPY AS A TOOL IN EVALUATION OF FEMALE INFERTILITY

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Branch - II

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BONAFIDE CERTIFICATE

Certified that this dissertation is the bonafide work of **Dr.K.AMBIKA**, on **"A CLINICAL STUDY OF DIAGNOSTIC HYSTEROLAPAROSCOPY AS A TOOL IN EVALUATION OF FEMALE INFERTILITY"** during her M.S., (Obstetrics & Gynaecology) course from April 2012 to April 2015 at the Madras Medical College and Institute of Social Obstetrics, Govt Kasturba Gandhi Hospital for Women and children,Triplicane, Chennai.

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DECLARATION

I solemnly declare that the dissertation titled "**A CLINICAL STUDY OF DIAGNOSTIC HYSTEROLAPAROSCOPY AS A TOOL IN EVALUATION OF FEMALE INFERTILITY "** is done by me at Institute of Social Obstetrics, Govt Kasturba Gandhi Hospital for Women and Children, Madras Medical College, Chennai during September-2012 to August-2014, under the guidance and supervision of **Prof.DR.S.VIJAYA, M.D., D.G.O.,** Professor and Chief of the Department of Obstetrics and Gynaecology, Madras Medical College & Institute of Social Obstetrics, Govt Kasturba Gandhi Hospital for Women and Children,Triplicane, Chennai-5

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CONTENT

INTRODUCTION

Reproduction is an basic expectation of human life. The desire of reproduction is an important motivating human force**. F**e**rtility** stands for reproductivity, continuity and growth.

Infertility is an major health problem, which is present as long as the history of mankind.

Fecundability - Refers to the probability of achieving pregnancy within one menstrual cycle.

Fecundity- Refers to the probability of achieving a livebirth in a single menstrual cycle.

Infertility- Is defined as inability to conceive after one year of unprotected regular intercourse.

According to WHO, 60-80 million couples are infertile worldwide and 10 to 15% of couple in the reproductive age are infertile[1].

There is dramatic increase in the number of couples attending Medical advice, for infertility. The incidence of infertility varies between 5-15% in any community[2]. This problem may be due to the delayed child bearing to achieve educational, Professional goals and Socio-economic status.

The awareness of infertility is increased nowadays and multicentric approach to the treatment have been introduced**,** but the management of infertility is always challenging.

Normal fertility deponds on various male and female factors. Tubal and peritoneal factors are responsible for 20-40% of causes of female infertility[3]. These include tubal block, Pelvic inflammatory disease, pelvic adhesions, endometriosis and acquired uterine abnormality like uterine synechiae**.** So the assessment of tubal patency, peritoneal factors and uterine cavity are important in investigation of infertility. Laparoscopy is the gold standard diagnostic tool in evaluation of tubal and peritoneal factors. It allows direct visualization of all pelvic organs. Hysteroscopy is used for visualization of uterine cavity.

Laparoscopy is also called as “Keyhole Surgery” or “Minimal invasive Surgery”. It is the single procedure, which gives maximum information in evaluation of the female infertility**.** Abnormal findings of HSG is validated by direct visualization during Laparoscopy.

Laparoscopy has an advantage of careful assessment of the architecture of fallopian tubes and fimbria. Abnormality detected in laparoscopy like tubal obstruction, endometriosis and pelvic adhesions are treated at the same time during diagnosis. So, diagnostic laparoscopy

is an important part of assessment of couples with infertility**.** Laparoscopic chromopertubation is the gold standard method for tubal patency, is done in the same sitting. It is done by instillation of dye into the cervix and direct visualization of spillage from both fallopian tube through abdominal Ostia in case of patent tube. There is no spillage in patient with blocked tubes.

Hysteroscopy is the direct visualization of the uterinecavity with an endoscope**.** For complete infertility workup, evaluation of the uterinecavity is essential**.** 10 to15% of couples seeking treatment, have uterine abnormality, congenital or acquired. Hysteroscopy is the gold standard for evaluation of the endometrialcavity. It is an minimal invasive procedure, for diagnosis and treatment of intrauterine and endocervical pathology.

According to *Lindemann et al.,*(1979) combined Laparoscopy and hysteroscopy is used for complete evaluation of uterus**,** fallopiantubes and ovaries. In case of infertility not responding to normal treatment modality, it is mainly used for diagnosis of specific causes of infertility.

Hysterolaparoscopy is the essential tool in diagnosis and treatment of female infertility. It also allows to plan for further treatment in infertile patient. If the history, pelvic examination and diagnostic methods fails to

diagnose a specific pathology, Laparoscopy and hysteroscopy should be considered. Because it gives a definitive direction to the diagnosis and treatment of anxious women with infertility. Both diagnostic and operative procedures can be done at the same time, so it avoids the need for an second surgery.

AIM AND OBJECTIVES

- To study the evaluation of various causes of infertility in female with primary and secondary infertility, by diagnostic hysterolaparoscopy.

REVIEW OF LITERATRUE

Infertility appears to be one of the Commonest problems in Gynaecology. Infertility present in 10-15% of Indian population.

The Prevalence of infertility does not appears to differ among racial and ethnic groups. Infertility is more common among low socio economic status groups. But patients attending for infertility treatment are belongs to high socio-economic status. Easy access to infertility treatment and familiarity among better educated and high socio economic status groups increases the utilization of available medical resources.

INFERTILITY:

Infertility is defined as failure of conception despite 12 months of regular, unprotected intercourse. Around 57% of normal couples conceive within 3 months of regular and unprotected intercourse, 72% within 6 months, 85% within one year[4]. So, the one year time duration for attempted conception before the diagnosis of infertility is applied. Infertility is also defines as the inability of a couple to achieve biochemically (HCG) recognizable pregnancy after12 months of regular intercourse[5].

PRIMARY INFERTILITY:

Is known as inability to conceive inspite of 12 months regular, unprotected intercourse[6].

SECONDARY INFERTILITY:

Is known as inability to conceive in which prior pregnancy, although not a live birth has occurred[6].

CONCEPT OF FERTILITY:

Fertility is a relative state and only few individuals are completely fertile or sterile. Fertility varies from time to time in the same individual.

Physiological infertility:

In male - Childhood and oldage[7]

In female - Physiological sterility or sub fertility is seen:

- Before puberty
- Fertility is less till the 16 to 17years of age **(**Anovulatory cycles)
- During pregnancy and lactation
- Before menopause, fertility falls after the age of 34 years.
- After Menopause[7]

UNEXPLAINED INFERTILITY:

"Unexplained infertility"- is known when basic infertility evaluation reveals patent fallopian tubes, evidence of ovulation, normal semen analysis and no cause of infertility is identified. It is present in about 30% of infertile couples[8].

Unexplained infertility is diagnosis of exclusion, in which no abnormalities **a**re de**t**ected during standard infertility evaluation.

RISK FACTORS FOR INFERTILITY:

- Increase in age - As Age advance, fertility rate decreases
- Life style factors - Smoking, drinking,
  - obesity
  - stress
  -Multiple Sexual partners, which leads to STD and PID

- Occupation and Environmental factors.

  -Medications

  -Pollutants

- Psychological factors
- Medical and Surgical factors
- Pelvic infections

ETIOLOGY OF INFERTILITY[3]:

Male factor	-	20 to 30%
Female factor	-	40 to 55%
Bath Male and female factors	-	10 to 40%
Unexplained infertility	-	10 to 20%

CAUSE OF INFERTILITY IN FEMALE (%)[3]

- Ovulatory factors - 20 to 40%
- Tubal and peritoneal factors - 30 to 40%
- Uterine - Uncommon
- Unexplained - 10%

Causes of infertility in Female:

I. Ovarian factors

Primary – Ovary itself

Secondary –Hypothalamus-pituitary tract

They can be also classified as:

1. Oligoovulation /Anovulation

- Polycystic ovarian syndrome
- Resistant ovarian syndrome
- Endometriosis
- Failure – Genetic, infection, Surgical, immunologic, premature ovarian failure
- Tumour

2. Pituitary

- Abnormality of feedback mechanism
  - Pcos
  - Ovarian failure due to adrenal tumours
  - Weight loss
- Infection
- Trauma
- Tumours

3. Hypothalamus

A. Abnormalities of feedback mechanism are due to:

- Stress
- Weight loss
- Cushing's syndrome
- Congential adrenal hyperplasia
- Ovarian, adrenal tumours

B. Luteal phase defect

C. Luteinized unruptured follicles

II) Tubal factors

- Previous tubal surgery
- Adhesions, blockage (in gonococci, TB, mycoplasma infection)
- Tubal spasm / occlusion
- Tubal endometritis.

III) Peritoneal factors

- Adhesions
- Endometriosis
- Infections

IV) Uterine factors

- Fibroid uterus
- intrauterine synechiae
- congenital malformation
- Endometrial TB

V) Cervical factors

- Fibroid occluding the lumen
- Cervical stenosis
- Incompetent Cervix
- congenital elongation of Cervix
- Antisperm antibodies in Cervical mucous.

VI) Immunological factors.

VII) Psychosexual factors

VIII) Chronic diseases

IX) Unexplained infertility

INVESTIGATIONS FOR FEMALE INFERTILITY:

The following basic investigations are done during evaluation of female infertility.

1) Tests for assessment of tubal function:

- Rubin's air insufflation tests.
- Hysterosonosalphingography
- Hystero salphiangography
- Falloscopy/salphingoscopy
- Laparoscopic chromopertubation

2) Test for ovarian factors:

- Basal body temperature chart
- Hormonal assays – LH, serum progesterone
- Endometrial biopsy
- Ultrasonography

3) Tests for peritoneal factor:

- Laparoscopy

4) Tests for uterine factor

- Hysterosalphingography
- Hysteroscopy
- Laparoscopy

5) Tests for cervical factors:

- Post coital test
- Invitro mucous Penetration test

6) Tests for immunological factors:

- Anti sperm antibody test

LAPAROSCOPY

The word **"Laparoscopy"** is known from greek word **Lapara** (loin or flank) and **Skopein** ("to see or view, examine). Laparoscopy means endoscopic evaluation of pelvic and peritoneal cavity through anterior abdominal wall. There is a limit to the information obtained from clinical assessment. So direct visualization of the pelvic contents is desirable. Direct visualization of the pelvic organs, improve the diagnostic accuracy, when other investigation methods fails to diagnose the cause.

HISTORY REVIEW OF LAPAROSCOPE:

In 1805 **Philip Bazzini**, of Frankfurt first attempted to visualize the interior of the bodycavity.

In 1879, **Max Nirze** was used the lens to magnify the area to be visualized. It is the basic of the optical system of modern endoscopy. **Nirze** was called as **"Father of Modern endoscopy"[9].**

In 1903, **von ott**, was first observe the pelvic organs through an incision in vaginal vault by using reflected light from head mirror.

In 1910, **Jacoveaus** was first coined the term "Laparoscopy", after introducing a nitze cystoscope in peritoneal cavity[10].

In 1912, **Nordentott**, who visualize the female genital organs after creating artificial pneumoperitoneum in trendelenburg position.

Heinzkalk(1929), developed a 135^0 lens system and dualtrochar approach. He was known as **"Father of internal laparoscopy".**

Verres (In 1938), introduced a pneumoperitoneum needle with spring loaded inner blunt probe, which is surrounded by sharp outer sleeve.

Telinde (1939) was attempted endoscopy to visualize pelvic organs by vaginalroute.

In 1950 **Palmer** and **Fragenteim**, introduce a electro coagulation for tubal sterilization.

Fragenteim (1952) developed a numerous clinical indication for laparoscopy. He made first modern carbon dioxide installation apparatus. In 1968, He also noticed ovulation through laparoscope.

In 1972, Liston et.al., – Visualize the tubal function through laparoscopy.

Frangeinheim (1967), Colart (1970), Maathus (1972) also noticed that laparoscopy as an method used for direct visualization of tubal pathology, which replace hysterosalpingography in many centres.

Duignan et.al.,(1972) states that laparoscopy should be routinely used in investigation of all case of infertility.

In 1974**, Siegler, Corson** (in 1977) suggested that laparoscopy should be performed 6-8 months after a negative infertility evaluation. Now, Infertility evaluation of Female, does not complete without doing endoscopy.

LAPAROSCOPY IN INFERTILITY

Laparoscopy should be included in the evaluation of infertility in a female, and it is considered as one of the basic diagnostic method. Laparoscopy plays an significant role in evaluation and treatment of female infertility. The investigation of the couple with infertility cannot be considered complete, unless a diagnostic laparoscopy has been performed.

Laparoscopy plays an important role in visualization of peritoneal cavity and external aspect of pelvic structures. It aids in the diagnosis of pelvic – anatomic relationship, resulting from leiomyoma, Ovarian tumour, endometriosis, pelvic adhesions, fallopiantube obstruction and other rare peritoneal pathologies. The pelvic anatomic relationship is obscured by leiomyomas and ovarian tumours cannot be detected radiologically Laparoscopy is clearly the diagnostic method of choice in these conditions.

The sensitivity and specificity of HSG in diagnosing Peritoneal and Periovarian adhesions is disappointing. Fallopian tube obstruction is initially diagnosed with HSG, but it has false positive rate of 4-20%. The diagnosis of fallopian tube obstruction is confirmed by laparoscopic chromopertubation test.

Laparoscopy remains the gold standard in diagnosis of endometriosis. It allows complete inspection of peritoneal surface and biopsy of suspicious lesions can be taken USG and MRI imaging have only moderate sensitivity in detecting endometriosis and peritoneal lesions. But, laparoscopy is highly sensitive and specific method.

Pelvic tuberculosis, disseminated leiomyomatosis, endosalphingities are other unusual peritoneal pathologies, which are diagnosed by Laparoscopy. It is also useful in detecting uterine malformation, tuboovarian mass.Tuberculosis of fallopiantube is diagnosed by the typical beaded appearance[11].

Templeton and kerr reported that laparoscopy should replace the other diagnostic methods of routine primary assessment of the genitaltract[12].

The world health organization manual also recommends laparoscopy is an standardized investigation for the couple with infertility

Coltart TM (in 1970) studied laparoscopic chromopertubation in 36 patients with bilateral tubal occlusion on HSG Laparoscopy show bilateral tubal patency in 11 patients and unilateral patency in 7 patients. He concluded that laparoscopy to be done on all patients with bilateral negative HSG before tubal surgery[13].

Duignan NM et.al., (1972) concluded that laparoscopy provides an more accurate assessment of tubal patency than with HSG[14].

In 1990, chakraborti et.al.[15], studied diagnostic laparoscopy in to infertility patients. He found that commonest factor is tubal (39%), pelvic adhesion (9.3%), genital TB (8.3%), PCOD (6.2%), endometriosis (4.6%), hydrosalphinx (4.6%) and pelvic TB (1.5%).

Micinski pe et.al.,(1993) reported that, laparoscopy revealed pathological findings in 51% of 57 unexplained infertility patients with apparently normal HSG[16].

Subrata Lall et.al (2004) studied on 100 interfile patients comparing laparoscopy, HSG and sonosalpingography for diagnosis of pelvic pathology. He concluded that pelvic pathology is best detected with laparoscopy[17].

In 2005, Hassan L, Naz T, gulmeen, Nighat F, saltan S, conducted a study on laparoscopy evaluation of 136 infertile patient. They found that tubal disease is most common and diagnostic laparoscopy is the mere valuable method for complete assessment of female infertility and planning further treatment[18].

Indication of laparoscopy in infertility

1. Failure of conception with in one year of therapy.
2. Elderly patients (>30 years) within 6-12 months of marriage.
3. Past pelvic inflammatory disease-to know the residual lesions.
4. Suspected tubal pathology, uterine anomalies by HSG
5. Clinical suspicion of endometriosis, pelvic TB.
6. Amenorrhoea and subfertility.
7. Past History of tuboplasty surgery.
8. History of Insemination failure.
9. Preoperative to planning of reproductive surgery.
10. Patient not responding to ovulatory drugs.

Timing of laparoscopy in infertility

Laparoscopy is an single diagnostic method in infertility, which provides the maximum information in a single procedure.

The ideal time for testing the tubal patency, is postmenstrual. Because, the valve like action of the endometrial growth at the cornual end will not occur and false cornual block report will be less. But the usual time for laparoscopy is one week post ovulatory, so the tubal patency, ovulatory status and ovulation stigma are viewed at the same time.

Laparoscopy is performed during menstruation, in a suspected case of endometriosis.

In a patients, planned for concomitant tubal surgery, laparoscopy should be planned in follicular phase, to avoid excess pelvic vascularity which is present in lutealphase.

HISTORIC REVIEW OF HYSTEROSCOPE:

The first gynecological endoscopic procedure done by **pantoleoni in 1869**, was the hysteroscopy[19].

In 1898, beutner, proposed a new type of hysteroscope, which was equipped with water sprinkler[20].

The use of cystoscope with an internal light with a lens system to examine the uterine cavity, was described by charles David in 1907.

Hein erg in 1914, devised a irrigating system for the uterine cavity to rinse off the blood which hindered the vision[21]**. Rubin[22] in 1925,** insufflated the uterine cavity by carbon dioxide inspite of water.

Schroeder in 1934, succeeded in developing an instrument with excellent three-dimensional view and forward viewing optical system.

In Japan, **Mohri (1971),** designed an first fibreoptic hysteroscopy.

The use of liquid distension media as a routine since 1980s, and many new hysteroscopy like endometrial ablation becomes popular.

Frommid-1980s, hysteroscopy has replaced dilatation and curettage in diagnosing intrauterine pathology[23].

Hamou, in 1981 deviced the hysteroscopy with new visual optics with magnification up to X180 and with fine diameter of 40mm[24].

HYSTEROSCOPY IN INFERTILITY

Hysteroscopy plays a benefit role in reproductive medicine in following ways:

1. It plays important role in the diagnosis of pathology in endocervical canal, uterine cavity in patients with infertility and repeated IVF failures.

2. It is also used for surgical correction of diagnosed pathology and to provide a normal uterine cavity for embryo transfer.

Diagnostic hysteroscopy has an significant role in diagnosis of concealed pathology and treatment of various pathologies successfully.

Cervical and endometrial polyps are removed with scissors of graspers by using resectoscope in hysteroscopy.

Cervical stenosis and synechiae are corrected with hysteroscopy mechanical dilatation. Tubalostia obstructed with mucous debris and memvranes can be treated by hysteroscopy guided tubal cannulation. Uterine cavity adhesions, malformation and large submucous myomas are important pathologies, which are corrected by opening of the uterine cavity. Now, hysteroscopy correction of uterine malformation leads to less early pregnancy loss and increased conception rates. In the recent years, hysteroscopy is increasingly used for direct visualization of uterine cavity and it is considered best method than HSG.

In 1980, **valle RF** evaluated 142 infertile patients with hysteroscopy[25]. Various pathologies like submucous myoma, endometrial polyps, intrauterine adhesions and uterine septum present in 62% patients.

In 2000, Hulke I, De Brugne F, Balan P stated that diagnostic hysteroscopy must be included in invasive workeup of infertility[26].

Stefano Bettocchi et.al.,(1999-2007) studied that hysteroscopy was used as both diagnostic and therapeutic method in a single procedure[27].

In 2000-2005, **G.A. Rama Raju et.al**., concluded that hysteroscopy is a reliable diagnostic tool to evaluate uterine cavity abnormalities[28].

In 2002-2006, **Martin koskas et.al.,** concluded that Abnormal hysteroscopy findings in 40% of 557 infertility patients[29].

In 2009**, Mojghan Barati et. al**., studied office hysteroscopy in 54 patients with unexplained infertility[30]. Inspite of normal HSG and USG results, hysteroscopy shows 38.8% positive finding. So diagnostic hysteroscopy should be performed during routine workup of infertility.

In 2010, **Lasmar RB et** al studied hysteroscopy evaluation in 953 infertility patients[31]. Abnormal findings diagnosed in 54.2%, including intrauterine synechiae (19.4%) endometrial polyp (12.1%), cervicalpolyp (6%), submucousmyoma (4.9%) endometrial hyperplasia (4.1%), adenomyosis (0.5%), endometritis (0.4%).

Indications of hysteroscopy in infertility:

1. Unexplained infertility.
2. Abnormal hysterosalphingogram.
3. Suspected intrauterine pathology, uterine anomalies.
4. Abnormal uterine bleeding associated with infertility.
5. Pregnancy Wastage.

EQUIPMENTS FOR HYSTROSCOPY:

1. **Hysteroscopes**

The telescope contains 3 parts: the objective lens, the eyepiece and the barrel. The focal length and angle of the distal tip of instrument is needed for visualization.

0,12,15,25,30 and 70 angle options are available. A 0 angle hysteroscope offers panoramic view and A 30 angled hysteroscope improves the view of the ostia in abnormally shaped uterine cavity.

Different types of hysteroscopes are available, based on variation diameter and the degree of flexibility. They includes Rigid, flexible hysteroscopy, contact hysteroscopes and microcolpo hysteroscopes.

RIGID HYSTEROSCOPES:

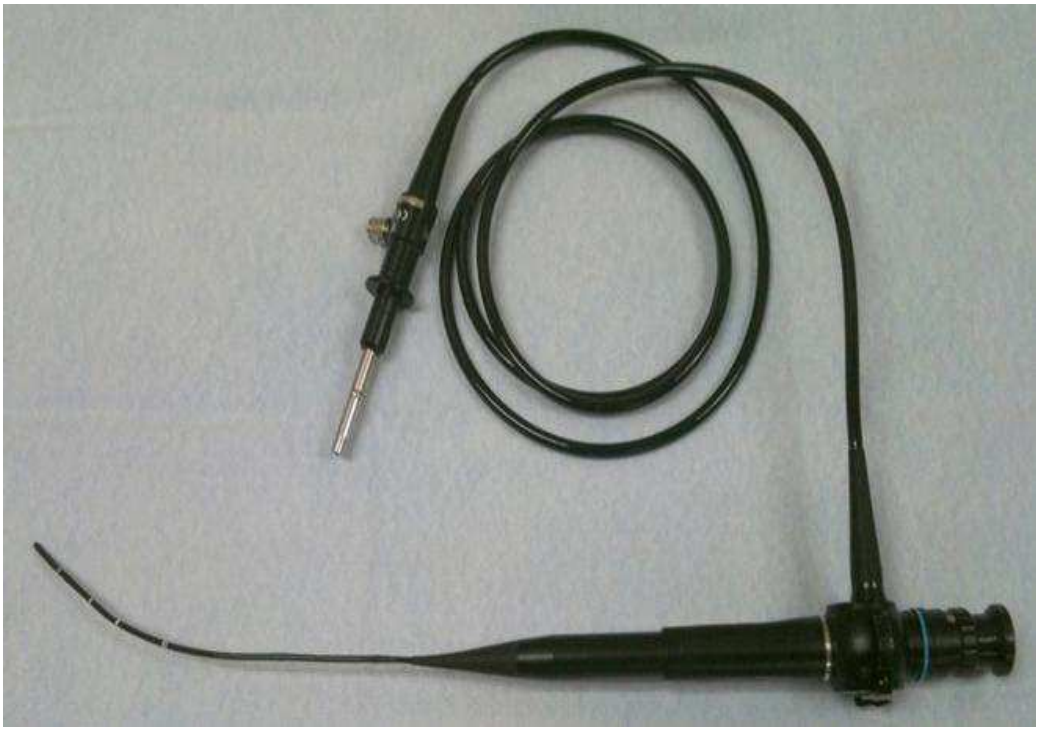
It is the most commonly used instruments. Their wide range of diameter allows for diagnostic and complex operative procedures. For a diagnostic hysteroscopy, a 30 degree oblique lens with 2.9 to 3mm diameter and 4 to 4.5mm detachable external sheath is used.

Rigid hysteroscope with larger than 5mm diameter, is used in operative procedure.

SEMI – RIGID HYSTEROSCOPE WITH BOTH INFLOW & OUTFLOW PORTS

RIGID HYSTEROSCOPE

FLEXIBLE HYSTEROSCOPE



FLEXIBLE HYSTEROSCOPES:

It is most commonly used for office hysteroscopy. It has flexibility with a tip deflects over 120-160 degree. Those with 3.1 to 3.7mm diameter used for diagnosis and 4.9 to 5.3mm diameter used for surgery. It is most appropriately used in irregularly shaped uterus and to navigate around intrauterine lesion.

2. Light Source:

Three types of light generation are used, includes tungsten, metal halide and xenon. A xenon white light with 150 watts provides best video imaging.

3. Surgical Instruments:

The following instruments are available in both rigid and flexible hysteroscopes.

i. Biopsy forceps- to take directed biopsy from a lesion.
ii. Scissors- to excise a polyp, septum and to lyse synechiae
iii. Grasping instruments- to remove foreign bodies.
iv. Scalpel- to cut the tissue with high power density at its tip
v. Rollerball, ellipsoid- for endometrial ablation.
vi. Morcellator- to remove endometrial polyps or fibroids.
vii. Loop electrode- for resection of fibroid, polyp.

viii. Vaporizing electrode- for destruction of endormetrialpolyp, fibroid, intrauterine adhesions and septal resection, endometrial ablation.

4. Energy Sources:

Monopolar cautery- It cuts and coagulates tissue by contact desiccation and resistive heating. A thin electrode is used to cut tissues and ball or barrel is best suited for coagulation.

Bipolar cautery - The versa point system uses bipolar cautery, which includes a spring tip for hemostatic vaporization of large areas, a balltip for precise vaporization and a twizzle tip for hemostatic resection and morcellation of tissues.

Laser Technique:

Argon, Nd YAG laser and potassium-titamyl-phosphate(KTP) are used in gynaecological procedures.

5. Distention Media:

For safe and satisfactory hysteroscopy, continuous clear vision is essential. The uterine cavity is better visualized by infusing suitable medium under pressure of 70 mmHg.

Gaseous media- co2 under pressure at a rate of 40ml/min and provide excellent visibility.

Liquid media- It causes compression of vessels to decrease the bleeding and distension of cavity for better visualization

i) High viscosity fluids-

Dextran 70 is an excellent media for hysteroscopy. But the dried residues clog the hysteroscopic sheath. Allergic reactions, fluid overload and coagulopathy can occur.

ii) Low viscosity fluids-

Normal saline (0.9% Nacl) is cheap, clear and the electrolytes concentration is approximates with blood, so metabolically inert.

Ringerlactate – cannot be used, because of its electrical conductivity

Hypotonic, low viscosity fluids like 5% mannitol, 1.5% glycine, 3% sorbitol-improves visualization when bleeding occurs. But it causes volume overload and hyponatremia.

LAPAROCSOPIC EQUIPMENTS:

The optimal set of instruments are necessary for perfect grasping, cutting, ligating and to attain perfect hemostasis.

Operating table and its attachment:

It is essential for to place the patient in lithotomy position for proper examination, to facilitate uterine manipulations and chromopertubation.

Uterine Manipulation

It is used to manipulate the uterus in different directions to visualize the pelvic structures. Rubin's HSG canula is the most commonly used.

Veres Needle:

It is an double-channelled needle, and contains blunt cannula within a sharp tipped cannula. It is used to create pneumoperitoneum. The length is 100-150 mm with the diameter is the same as that of 16 guage needle.

Insufflator Apparatus:

It is used to produce pneumoperitoneum, the main function of an insufflator is to control the presence of gas delivered to the abdominalcavity.

Trocar and Cannula:

This is used to make an opening in abdominal wall and to introduce instruments into the peritonealcavity.

Telescope (or) Laparoscopes:

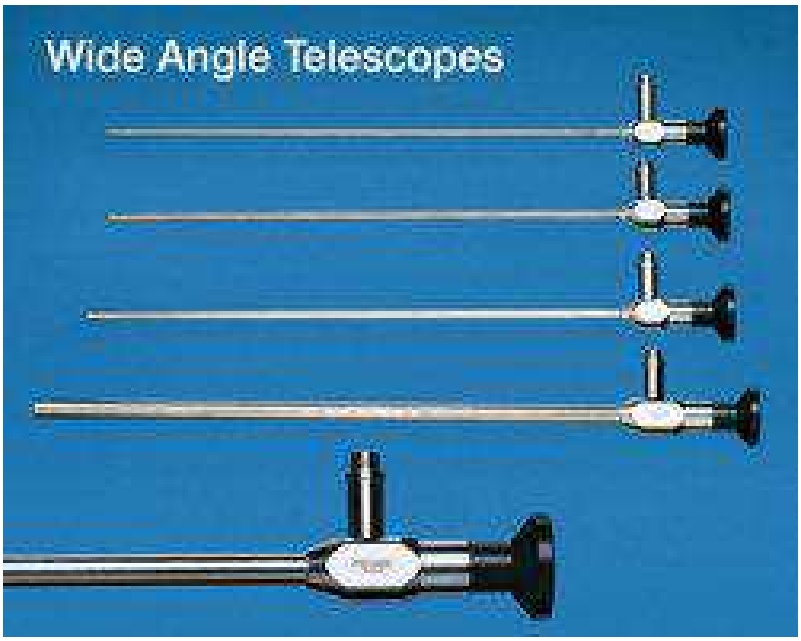
Diagnostic laparoscopes are available as different types, deponding on angles of view.

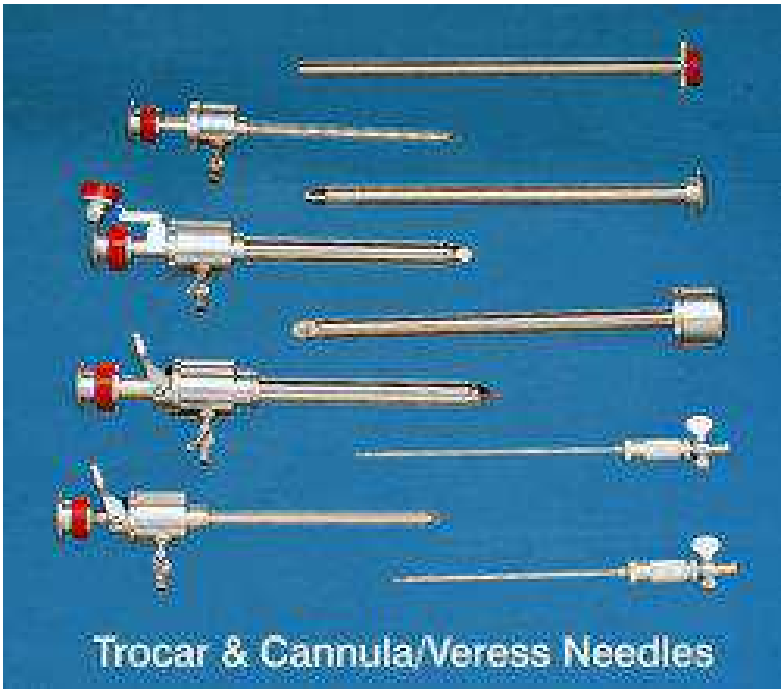
(I) Straight forward laparoscope – provides the view of pelvis similar to that seen in laparotomy.

(II) Forward obliquetype – provides visualization of wide anatomic core and also narrow spaces suchas culde–sac or lateral pelvic wall beyond the ovary[32].

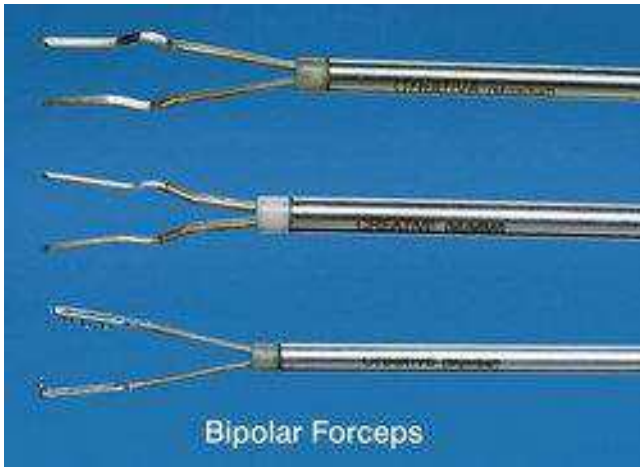
The diameter of diagnostic and operative laparoscope varies from 4 to 12 mm. The smallest diameter laparoscope is used for diagnostic

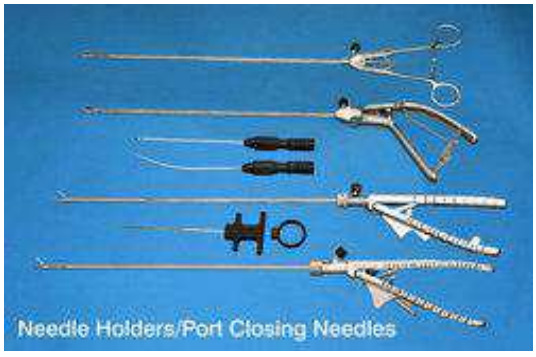
TELESCOPES AND TROCAR & CANNULA / VERESS NEEDLES





LAPAROSCOPY INSTRUMENTS





0 DEGREE AND 30 DEGREE TELESCOPE

LIGHT CABLE

INSTRUMENTS TABLE

purposes. The degree of magnification deponds upon the distance of the laparoscope from the object.

Light Sources:

The light beam is transmitted through fibreoptic cables, for optimal visualization.

Cameras and Television Equipment:

Ancillary Instruments:

The ancillary instruments used through second puncture site are biopsy forceps, graspingforceps, scissors, suction /irrigation cannulas, coagulators, electro surgery, laser and the argon beam coagulator, ligating and suturing equipment.

PRINCIPLES OF HYSTEROLAPAROSCOPY:

I. Preoperative Evaluation – includes,

- Complete history
- Thorough physical examination
- Laboratory investigations
- Evaluation for planning of route of anaesthesia
- Informed consent for benefits and risk

II. Preparation of the Patient

Patient should be adviced nil orally for 6 – 8 hours. Bowels should be prepared.

III. Preoperative Equipment

All the equipments are kept available and in perfect working status. If required, all instrument needed for laparotomy also should be kept ready.

IV. Anaesthesia

General anaesthesia is preferred, because extensive manipulation of the uterus and its adnexa is required during the procedure.

Positioning of the Patient:

The lithotomy with tendelenburg position is preferred, to facilitate adequate depression of the uterine manipulator and also for hysteroscopy.

Bladder and Perinealcare:

Patient was adviced to void just before induction of anaesthesia. Then, a pelvic examination is done to confirm the pelvic findings.

Preparation and Draping:

The abdomen is cleaned with betadine and spirit from the xiphisternum to the pubic symphysis. The perineum and vagina also cleaned and draped.

THCHNIQUE OF HYSTEROLAPAROSCOPY

DIAGNOSTIC HYSTEROSCOPY:

Diagnostic hysteroscopy is used for visualization of the uterinecavity and for diagnosing abnormal uterine conditions. A small 5 to 7 mm hysteroscope with 30 degree angled can be used with isotonic normal saline (0.9% Nacl) distension medium. The ideal time is during the proliferative phase of the menstrual cycle. By using sim's speculum to retract the posterior vaginal wall and anterior vaginal wall retractor, the cervix is visualized. The anterior lip of cervix is a held with the single toothed tenaculum forceps. The uterinecavity is sounded and the length of the uterine manupulator adjusted. The telescope (hysteroscope) is assembled and introduced through the cervix.

Systematic examination of cervix, four wall of the uterinecavity and the tubal openings is done by axial movements of the telescope. Any abnormal pathologies must be documented

Operative Hysteroscopy:

It can be used to treat many pathologic abnormalities diagnosed during hysteroscopy. The uterine cavity is visualized and the both tubalostia, location and attachment of the lesion, proximity of internal os are noted. It is used for excision of submucous fibroid, endometrial polypectomy, intrauterine adhesiolysis, septal resection and proximal tubal cannulation.

Complications of Hysteroscopy:

(i) Intraoperative and postoperative bleeding – is the most common complication. It is managed by aspirating the blood and increase the pressure of the distension medium.

(ii) Poor visibility – can be due to deep insertion of the hysteroscope which causes the telescope to lies directly in contact with the endometrium. It is managed by withdrawing the telescope.

(iii) Uterine perforation – occurs most commonly during myomectomy, septal resection and intrauterine adhesiolysis. It can be prevented by negotiation of the cervix and internalos under direct observation and simultaneous laparoscopy.

(iv) Infections – In presence of uterine, cervical infection and salphingitis, due to distension medium.

Complications due to distension medium

- Gas embolism
- Thermal injury to bowel,bladder
- Hyponatremia
- Injury to adjacent organs.

Dignostic Laparoscopy:

A small incision is made just below the umbilicus. The abdomen is inflated with co_2 for better visualization.

Primary trocar placement:

Various Techniques are used for creating a pneumoperitoneum and for placing an laparoscopic port. The common techniques are (1) veress needle and primary trocar insertion (2) direct trocar insertion, (3) expanding access canula (4) Left upper quadrant insertion (5) open laparoscopy.

Veres needle and primary trocar insertion:

The abdominal wall is elevated by grasping the skin and subcutaneous tissue. The veres needle is inserted through the umbilicus and into the peritoneal cavity, it is inserted towards the hollow of sacrum at 45 angle, to avoid injury to retroperitoneal vessel and intestinal tract. The proper placement is confirmed by placing drop of water on the opening and disappeared by lifting the abdominal wall.

Direct trocar insertion:

Primary trocar is inserted without inserting the veress needle

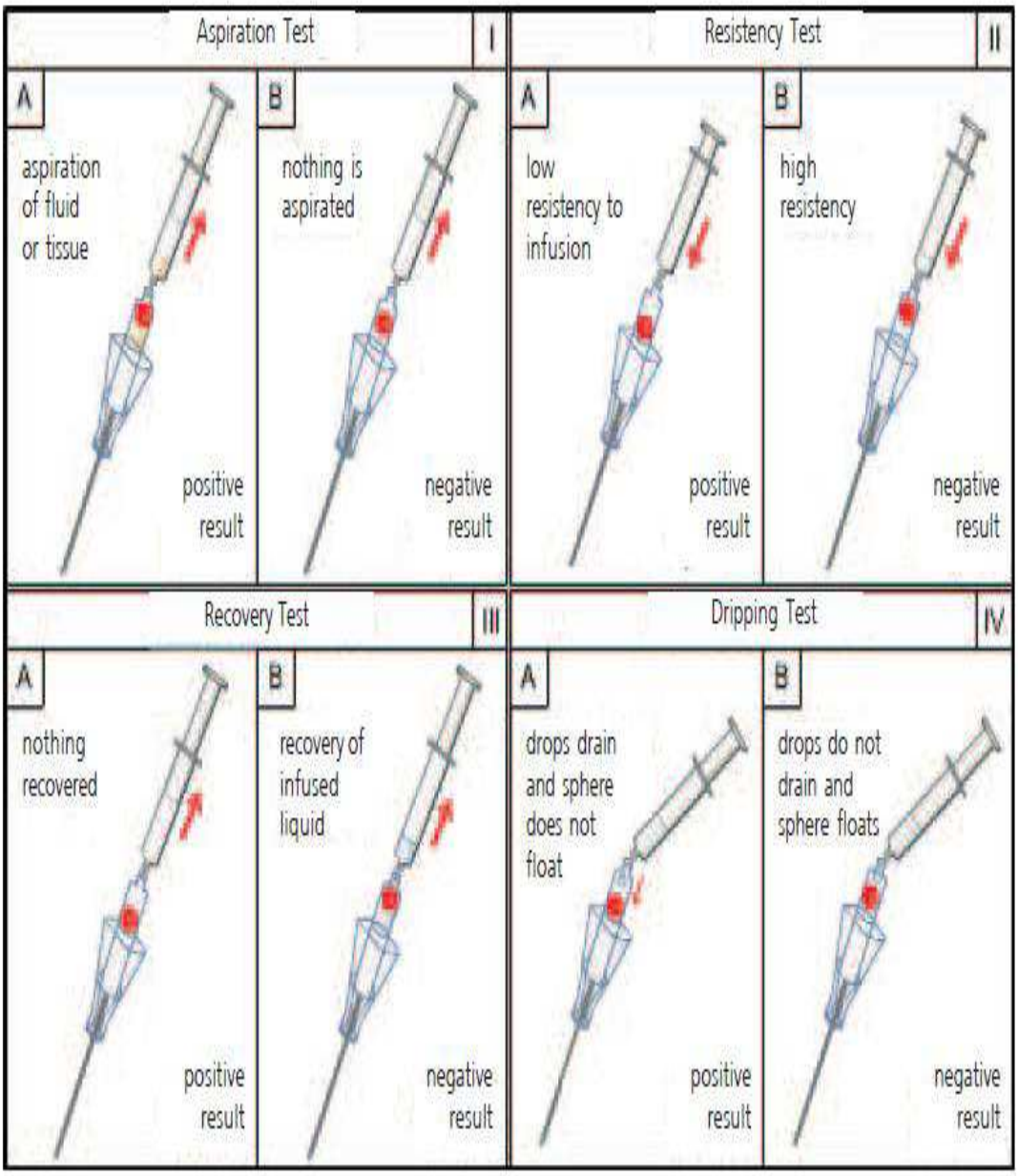
Introduction of secondary trocar and cannula:

After creating pneumoperitoneum, the trocar and cannula are introduced at 45 angle towards the hollow of sacrum. As the tip of the trocar enters the peritoneal cavity, gas will be heard to escape. Then the trocar is removed and the laparoscope is introduced into the cannula.

Introduction of Laparoscope:

Once the laparoscope is introduced through the cannula, external source of light is connected and proper position is confirmed by the visualization of pelvic organs. A general panaromic inspection of the pelvic contents is performed by laparoscope. Then a systematic view of

VERESS NEEDLE INSERTION TECHNIQUE



pelvis,from uterus, both adnexa, uterosacral ligaments is undertaken. Ancillary instruments are inserted through a second puncture.

Chromopertubation is important part of laparoscopic evaluation of infertility. With uterine insufflator, methelene blue or diluted indigo carmine is injected slowly into the cervix, and the spillage of the dye is noted through the fimbrial end.

Operative laparoscopy:

Additional instruments like scissors, probes, grasping instruments, biopsy forceps, electrosurgical instruments and suture materials are inserted through additional incisions. Procedures like removing of peritoneal adhesion around the fallopian tubes, ovaries, opening of blocked tubes, ovarian cystectomy, myomectomy can also done.

Removal of Instruments and Abdominal Closure:

After thorough laparoscopic visualization of the pelvis, a final survey is made to exclude any trauma and bleeding. Instruments and laparoscopes are removed under direct vision. The skin incision is closed by single stitch or clip, the patient can be discharged after 12 – 24 hours.

Complications of Laparoscopy:

Experience in procedure and meticulous use of proper technique are essential to prevent complications.

- Complications of pneumoperitoneum and insufflation
- Extraperitoneal insufflation
- Mediastinal emphysema
- Pneumothorax
- Injury to blood vessels, hollow organs
- Gas embolism
- Injury to liver and spleen.

Complications of Trocar Insertion –

Leads to bleeding from abdominal wall during the procedure. It is controlled by external suture of pressure dressing

- Complication during laparoscopy
- Port site haematoma
- Port site infections
- Incisinal hernia

CONTRAINDICATIONS OF LAPAROSCOPY[33]:

Absolute

- Severe cardiorespiratory disease
- Generalized peritonitis
- Acute intestinal obstruction
- Severe intraabdominal bleeding
- Abdominal & diaphragmatic hernia
- Extensive bowel adhesions
- Untreated advanced malignancy

Relative

- Extremes of body weight
- Intrauterine pregnancy
- Large intraabdominal masses
- Inflammatory bowel diseases

MATERIALS AND METHODS

SOURCES OF DATA:

The present study was done in the Department of obstetrics and gynecology, govt. Kasturba Gandhi Hospital, Triplicane – Chennai from September 2012 to August 2014. 100 cases were studied for the purpose of the study.

METHOD OF DATA COLLECTION

Patients attending outpatient department, govt. Kasturba Gandhi Hospital, Madras Medical College – Chennai were selected for the study. After taking detailed history, Clinical Examination and investigations, patients taken up for Diagnostic hysterolaparoscopy.

INCLUSION CRITERIA:

1. All the women aged between 20 to 40 years, attending outpatient department of Govt. Kasturba Gandhi Hospital with primary and secondary infertility.

2. To evaluate the cause in women with primary & secondary infertility with normal semen analysis of husband.

EXCLUSION CRITERIA:

1. Severe cardiac or respiratory disease
2. Generalised peritonitis
3. Diaphragmatic hernia
4. Umbilical hernia
5. Morbid obesity, age >40 years.

After taking thorough history, clinical examination, initial assessment and all necessary investigations, patients were adviced to report postmenstrually in the proliferative phase for diagnostic hysterolaparoscopy.

METHOD

Consent –

After a thorough pre-operative evaluation, informed and written consent was taken and make the patient to understand about the procedure, advantage and complication, need for laparotomy.

Premedication – Antibiotics, protonpumpinhibitor, tab dulcolax

Anaesthesia – General anaesthesia is preferred for all patients

After taking thorough history, initial assessment and necessary investigations, they were asked to report post menstually in the proliferative phase for hysterolaparoscopy.

Instruments used for hysteroscopy

1. Sponge holder
2. Betadine
3. Sims double bladed posterior vaginal wall speculurn
4. Single toothed vulsellum
5. Hegars dilator
6. 2.9 mm rigid hysteroscope with 300 oblique lens
7. Diagnostic sheath of 4 mm
8. Normal saline as distension media
9. Xenon white light of *150* watt

Instruments used during laparoscopy

1. Sponge holder
2. Betadine
3. Scalpel
4. Veres needle

5. Automated high flow insufflator with CO2 as a distending media to create pneumoperitoneum.
6. Trochar and cannula
7. 10 mm Telescope with 30^0 oblique lens
8. Halogen light source of 250 watts
9. Fibre optic cables
10. Camera
11. Monitor for proper image
12. Sims double bladed posterior vaginal wall retractor
13. Single toothed vulsellum
14. Uterine manipulator
15. Grasper
16. Scissors
17. Suction irrigation cannula
18. Diathermy- monopolar and bipolar
19. Hysterosalpingogram cannula
20. Methylene blue dye 10 cc
21. Dissecting forceps
22. Needle holder

PROCEDURE

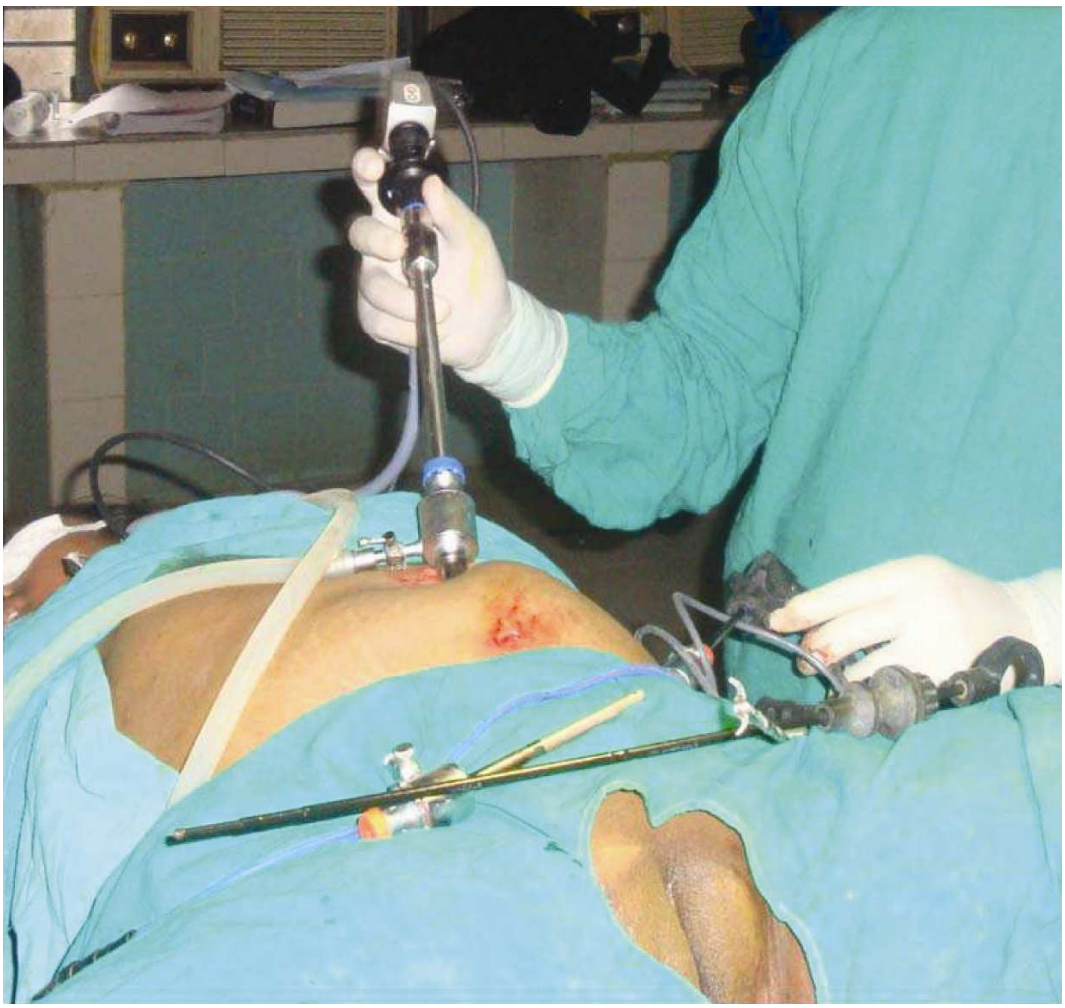
The first part of the procedure is hysteroscopy. After positioning the patient in lithotomy position and drapping, with the help of sims speculum cervix was visualised. Anterior lip of cervix was held with volsellum. The hysteroscope was assembled and checked for clarity of image. Then the hysteroscope was introduced though cervix.

As soon as, the hysteroscope was engaged into the external os of the cervix, the distension media flow was started. A 4mm hysteroscope with 30 degree view was usually used. For uterine distension, normal saline with 100mm Hg constant intrauterine pressure was maintained by using electronicpump (hysteromat)

Systematic examination of the intrauterine cavity was done during hysteroscopy. The cervicalcanal was visualized first. A narrow constrictive opening at the end of cervicalcanal was the internal os. The hysteroscope was manipulated under vision into the uterine cavity. It was introduced further upwards to visualize all four wall of the uterine cavity. Panoramic view of the two ostia visualized, then the anteior, posterior and lateral wall were visualized. Any abnormal findings were documented.

The second part of the procedure was laparoscopy. A small incision in infraumbilical region was made. Veress needle introduced and

DIAGNOSTIC LAPAROSCOPY PROCEDURE



pneumoperitoneum created with 2-3 liters of co_2 at the rate of 1 liter per minute. The satisfactory pneumopeitoneum was confirmed by uniform distension of the abdomen and noting obliteration of liver dullness. Then trocar and cannula were inserted, by elevating the abdominal wall.

During insertion, the tip of it was directed towards the hollow of sacrum. Entry of the trocar into the peritoneal cavity was signalled by escape of gas. Laparoscope was inserted, after removing the trocar. Then, the fibreoptic light cable was connected to the laparoscope and the light source. The camera was also connected to the laparoscope. The uterine manipulator used to elevate the uterus especially in retroverted uterus and to mobilize the adnexa.

The systematic view of the pelvis was undertaken, commencing from the uterus. The fundus, anterior surface and posterior surface of uterus was assessed. The fluid in pouch of Douglaus and any evidence of scarring, endometriosis was identified. Each uterosacral ligament was looked for endometriosis scarring and each adnexa was thoroughly visualized.

The anterior surface of the both ovaries and fallopiantube was inspected. The inferior surface of the ovary and the posterior leaf of the broad ligament upto uterosacral ligament were evaluated. The

fallopiantubes were examined from its distal to proximal segment, and any evidence of distal tubal occlusion (hydrosalpinx) fimbrial phimosis was assessed.

Chromopertubation is done by, 10ml of methylene blue injected slowly through the hysterosalpingographic cannula into the cervix. The spillage of the dye noted through the fimbrial end by laparoscope.

Post operative care – Patient was adviced to stay in hospital for 1-2 days. Antibiotics, and antispasmodics was given postoperatively. Patient was adviced to take normal diet as soon as she was comfortable. Patient was discharged on the next day with proper advice.

Followup –

The patient was instructed to

- Report to gynaecology OPD after 2 weeks for checkup
- Wound was inspected during follow up.
- Specific advice given to the patients based on pathology detected during the procedure.

CASE HISTORY EXAMINATION AND FINDINGS

1. Name
2. Address
3. Hospital No.
4. Registration no.
5. Date of examination
6. Age
7. Occupation of Patient
8. Husband's Occupation
9. Socio-economic Status
10. Primary Infertility
11. Secondary Infertility
12. Duration of Infertility
13. Presenting Complaints

    - Duration
    - Inability to conceive
    - Pain abdomen
    - White discharge per vagina
    - Urinary disturbances —Increased frequency / Dysuria / Burning sensation
    - Psychotic problems
    - Others

14. Menstrual history

    A. Age of Menarche

    B. Present Cycles

        - Duration of cycles
        - Flow in days
        - Dysmenorrhoea
        - Clots
        - Intermenstrual bleeding

    C. Previous cycles

        - Duration of cycle
        - Flow in days
        - Dysmenorrhoea
        - Clots
        - Intermenstrual bleeding

    D. LMP

15. Obstetric history

    A. Married Life

    B. Para Living Abortion Died

    C. H/o.Spontaneous Abortion/Premature Delivery/ IUD

    D. Last Delivery

16. Coital history

    A. H/o Dyspareunia-superficial/'deep

    B. Act once in how many days

    C. Orgasm achieved / not

    D. Use of contraceptive methods —OCPS/IUCDS/Barrier methods/Others

17. Past history

    A. H/o Tuberculosis

    B. H/o Dilatation and Curettage /Electrocautery/other treatment for cervical lesion

    C. H/o STD

    D. H/o DM/Thyroid Disease/HT

18. Family history

    A. HT/DM/TB/obesity

19. Personal history

    A. Bladder disturbances — Dysuria/increased freq./burning micturition/ others

    B. Habits —smoking / drinking / cocaine use

20. Previous management of infertility

    A. Investigation

        - Semen analysis
        - HSG
        - USG
        - Others

    B. Drugs

21. General physical examination

    A. Built — Asthenic / Average / Obese

    B. Breast

    C. Thyroid

    D. Features of Hirsutism

22. Systemic examination

    A. CVS

    B. Respiratory

    C. CNS

23. Per abdomen

    A. Obesity

    B. Mass per abdomen

    C. Others

24. Per speculum

    A. External Genitalia

    B. Vagina - Normal/Growth/Congested

    C. White discharges - Thick curdy /Frothy white / Greenish / Mixed

    D. Cervix - Erosion/Cervicitis/Polyp/Descent/ Hypertrophy

25. Per vagina

    A. Uterine position — Anteverted / Retroveed /Mid position

    B. Uterine size — Normal/Atrophic/Bulky/Mass/ Hypoplastic

    C. Uterine mobility — Mobile/Restricted

    D. Forniceal tenderness — Present — ant / post / rt lat / It lat Absent

    E. Adnexal mass — Present — Right/Left absent

Laparoscopic Findings

UTERUS	FALLOPIAN TUBE	OVARY	OTHERS
Anteverted	Normal	Normal	Tubo peritoneal factor
Retroverted	u/l patent	Streak	Endometriosis
Normal size	b/l patent	Enlarged	Pelvic adhesions
bulky	u/l hydrosalpinx	Pcos	Tuberculosis
Hypoplastic	b/l hydrosalpinx	Ovarian cyst	
Fibroid	Hypoplastic	Chocolate cyst	
Anomalies	T O mass	Follicular cyst	
Fixed retroversion	u/l cornual block	Ovulatory signs	
	b/lcornual block		

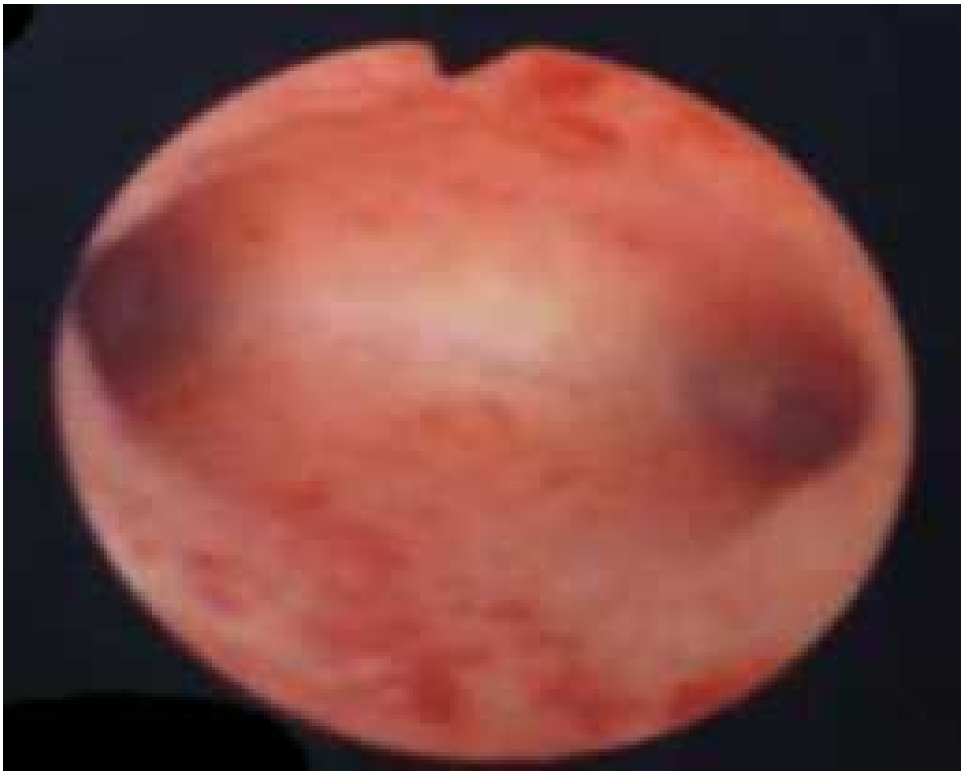
Hysteroscopic findings

- Cervical canal
- Cavity
- Endometrium
- Ostia

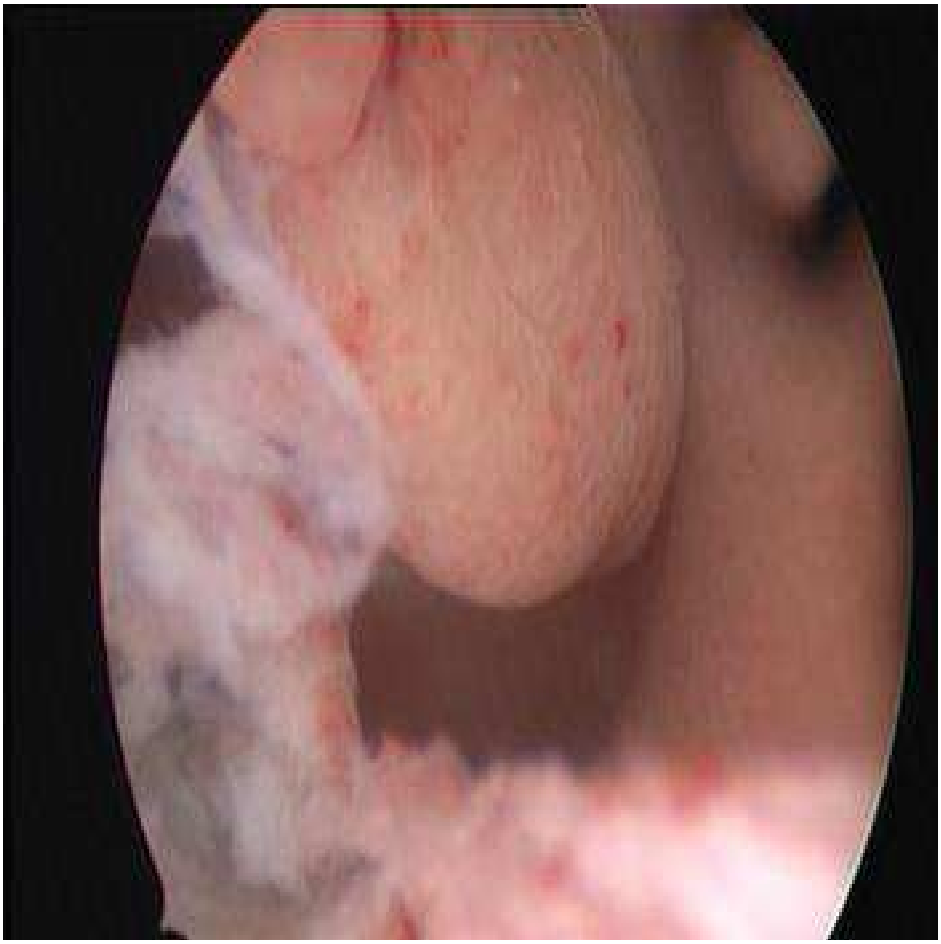
26. Any interventions

27. Any complications

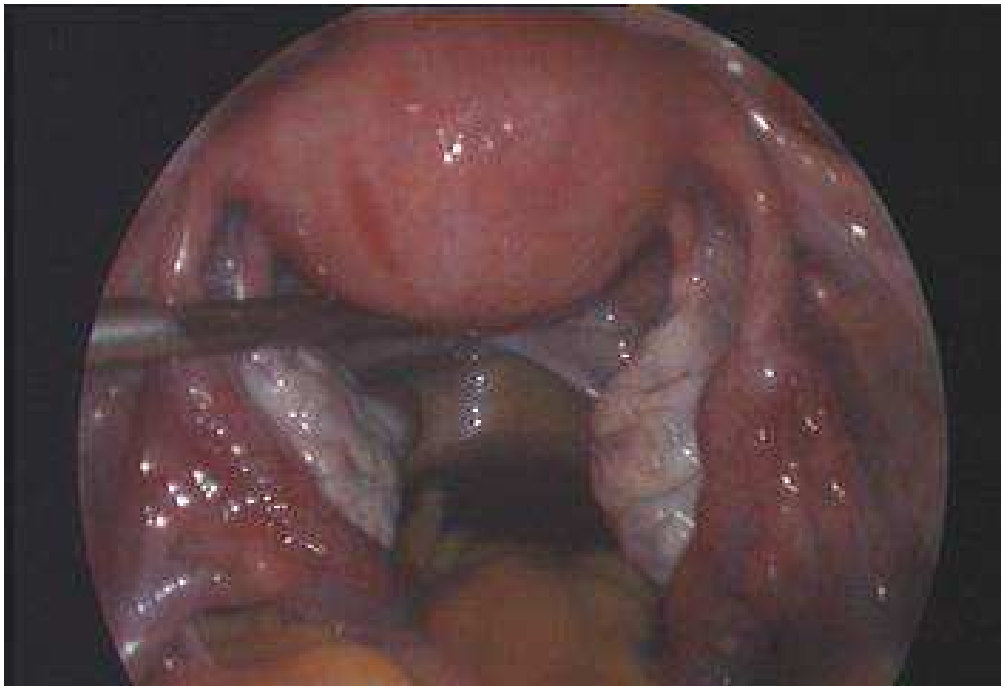
NORMAL HYSTEROSCOPY IMAGES



SUBMUCOSAL POLYP

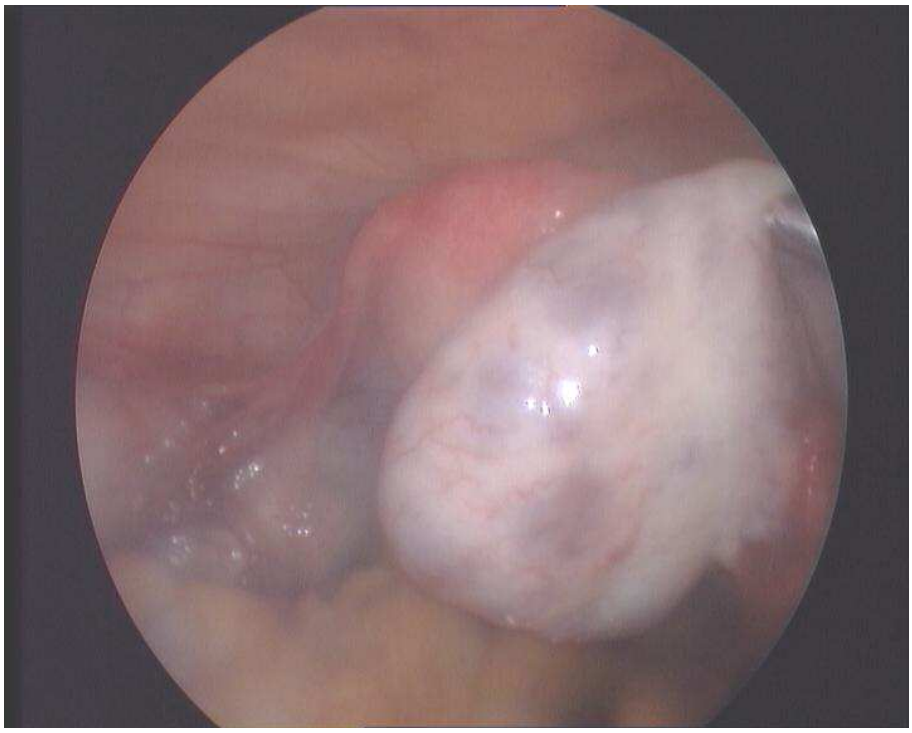


NORMAL LAPAROSCOPY IMAGE



B/L POLYCYSTIC OVARIES

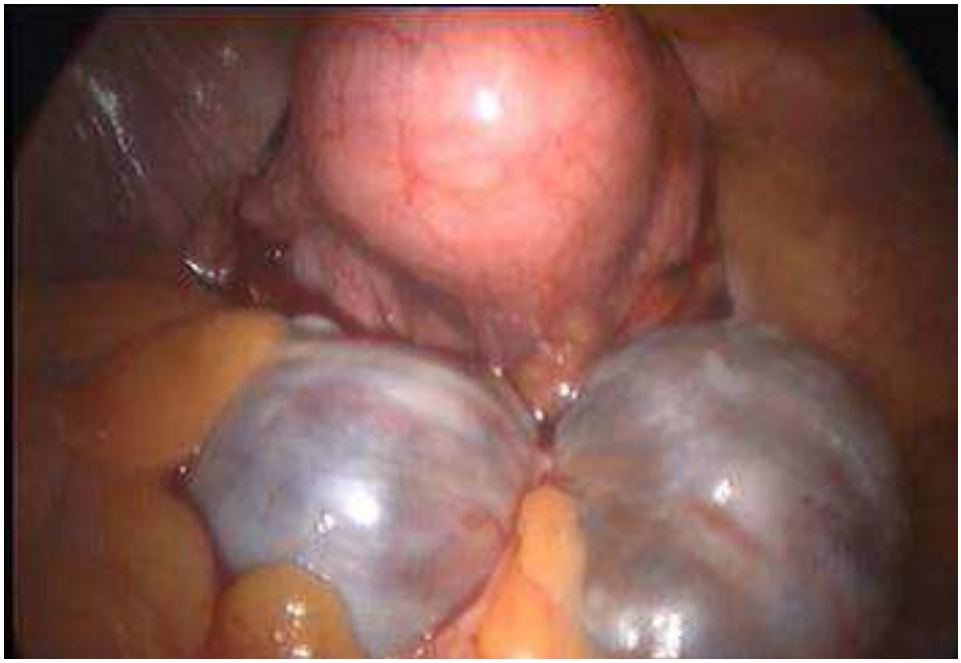
PCOS



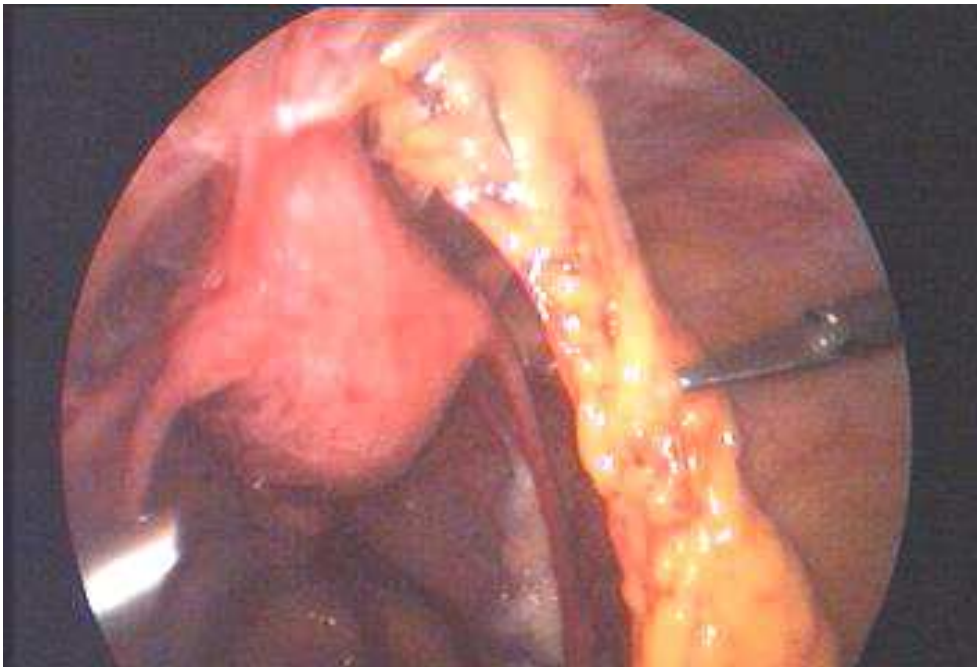
OVARY ADHERENT TO ANTERIORABDOMINAL WALL

ENDOMETRIOSIS

B/L ENDOMETRIOTIC CYST



OMENTAL ADHESION



HYDRO SALPHINX

CHROMOPERTUBATION TEST- POSITIVE

RESULT AND OBSERVATION

The present study was conducted in the department of Obstetrics and Gynaecology, institute of social obstetrics, Govt. Kasturba Gandhi Hospital, Chennai, during the period of September 2012-August 2014. A Total of 100 cases of Primary and Secondary infertility were studied to know the role of combined diagnostic laparoscopy and Hysteroscopy in the evaluation of infertility.

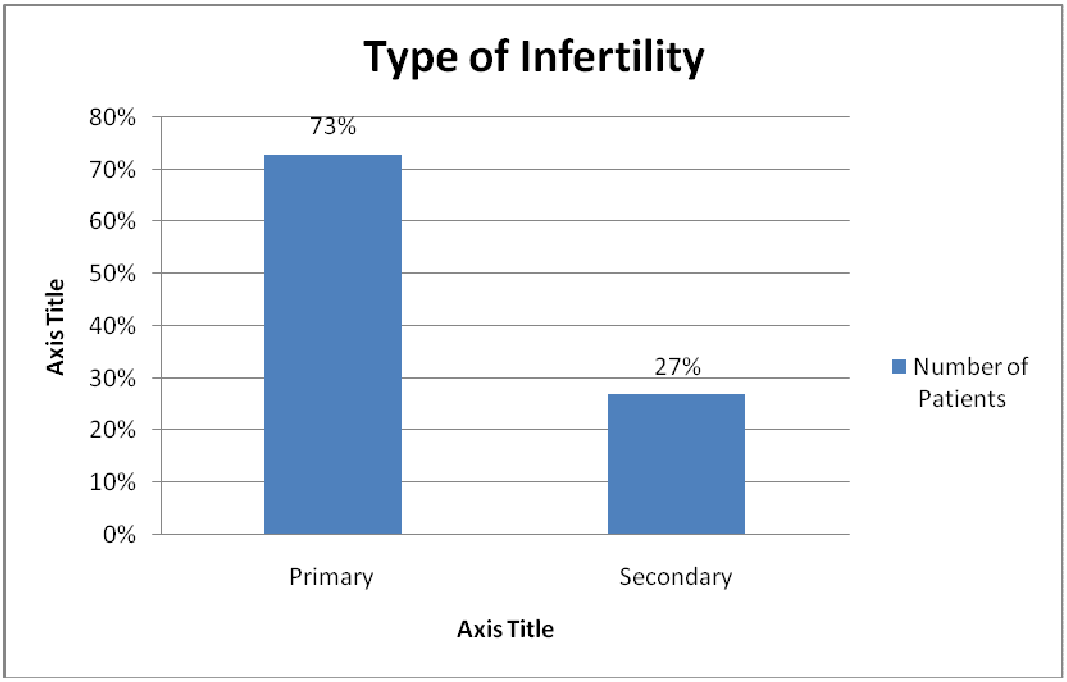
The History was taken thoroughly, detailed clinical Examination was done. All relevant investigations were carried out and final diagnosis was made after doing Hysteroscopy and laparoscopy. The proforma (Annexure I) contains above details which were recorded and collected datas were analysed by using chi – square test.

Table-1

Distribution of cases according to type of infertility

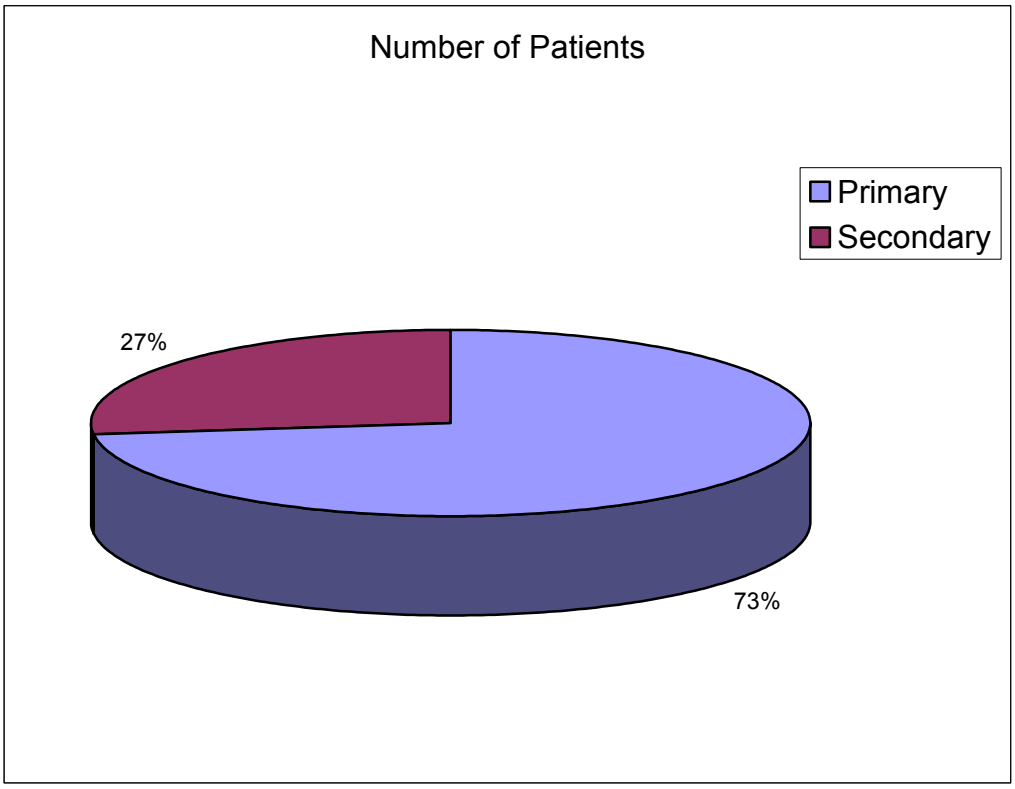
Type of Infertility	Number of Patients	Percentage	P Value
Primary	73	73%	<0.001**
Secondary	27	27%	
Total	**100**	**100%**	

Note: ** Denotes significant



In the present study, 73 cases (73%) were Primary infertility and 27 cases (27%) belongs to secondary infertility.

Distribution of cases according to type of infertility

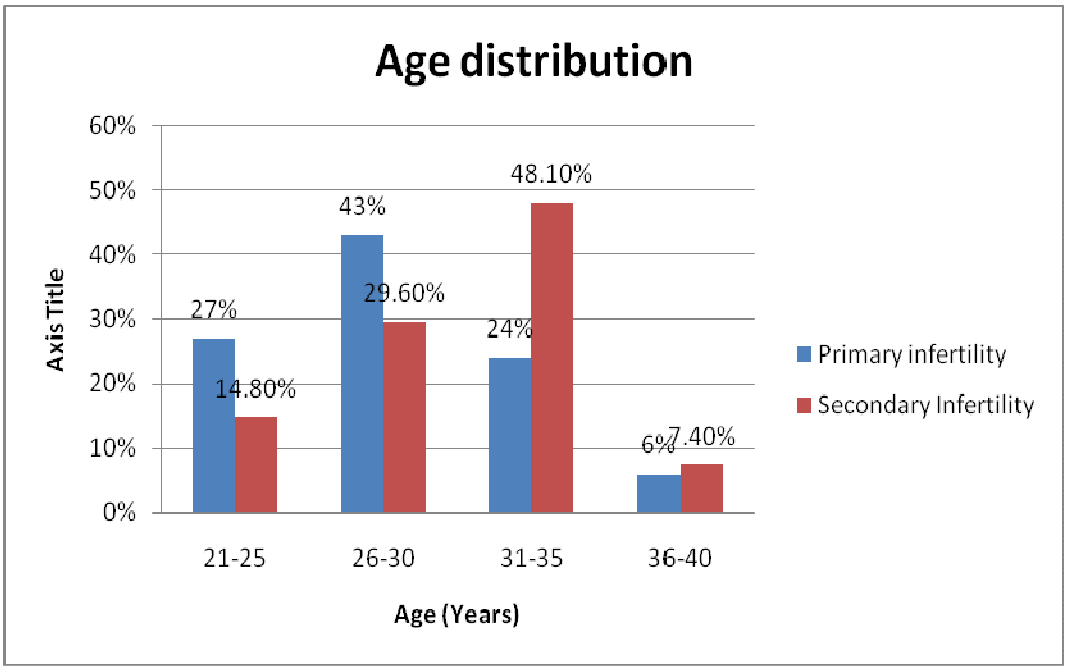


This pie chart shows distribution of cases according to the type of Infertility ,either primary or secondary.

Table-2

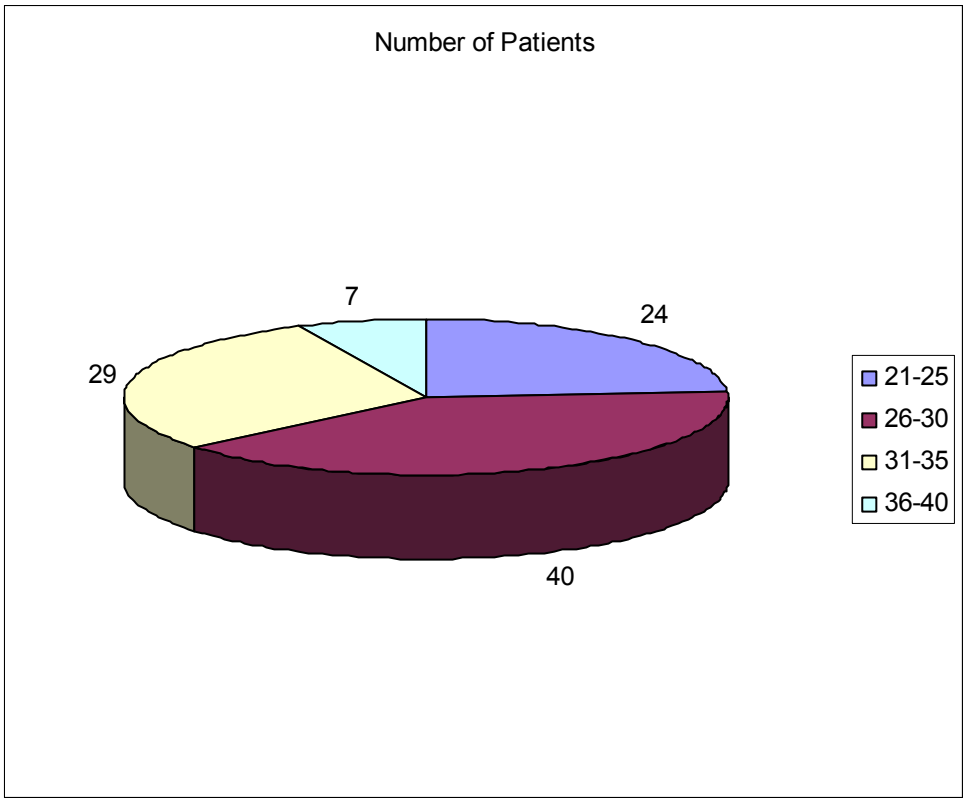
Age Distribution

Age (Years)	Primary infertility		Secondary Infertility		Total	
	Number of Patients	%	Number of Patients	%	Number of Patients	%
21-25	20	27%	4	14.8%	24	24%
26-30	32	43%	8	29.6%	40	40%
31-35	16	24%	13	48.1%	29	29%
36-40	5	6%	2	7.4%	7	7%
Total	73	100%	27	100%	100	100%



From the table, it has been seen that majority of patient in primary infertility belongs to the age of 26 to 30 years (43%) and in secondary infertility belongs to the age of 31to35years (48.1%). Totally 24% cases presented in the age group of 21 to 25 years, 40% cases from 26 to 30 years, 29% cases from 31 to 35 years,7% cases from 36 to 40 years.

Age Distribution



This pie chart shows total number of cases according to the age wise distribution .

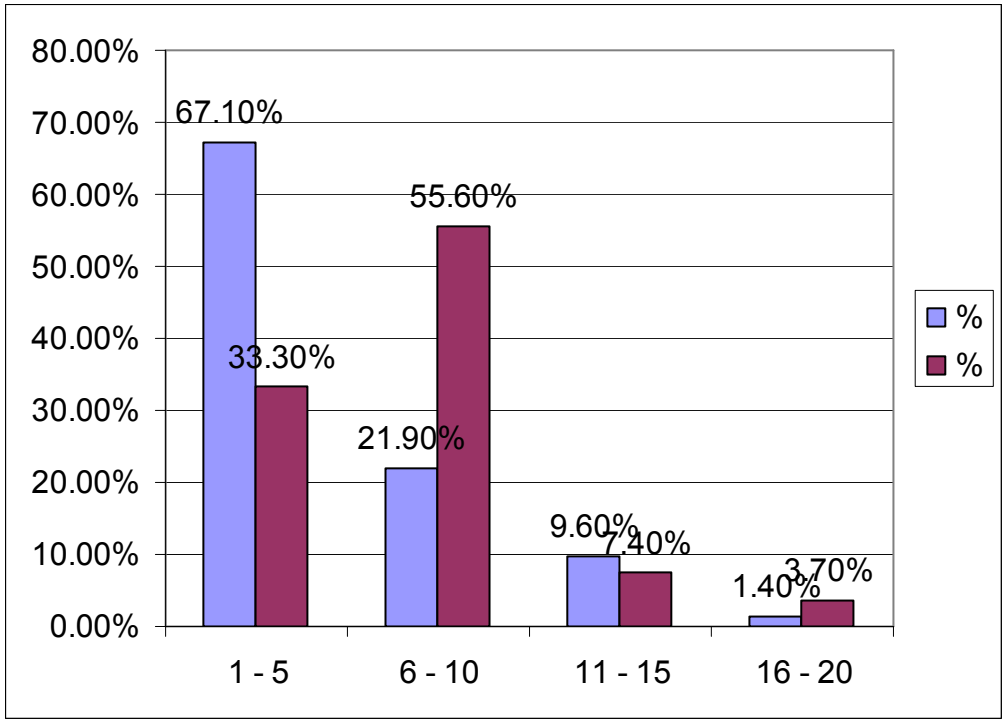
Table- 3

Duration of Infertility

Duration in years	Primary infertility		Secondary Infertility		Total		P Value
	Number of Patients	%	Number of Patients	%	Number of Patients	%	
1-5	49	67.1%	9	33.3%	58	58%	
6-10	16	21.9%	15	55.6%	31	31%	< 0.001**
11-15	7	9.6%	2	7.4%	9	9%	
16-20	1	1.4%	1	3.7%	2	2%	
Total	73	100%	27	100%	100	100%	

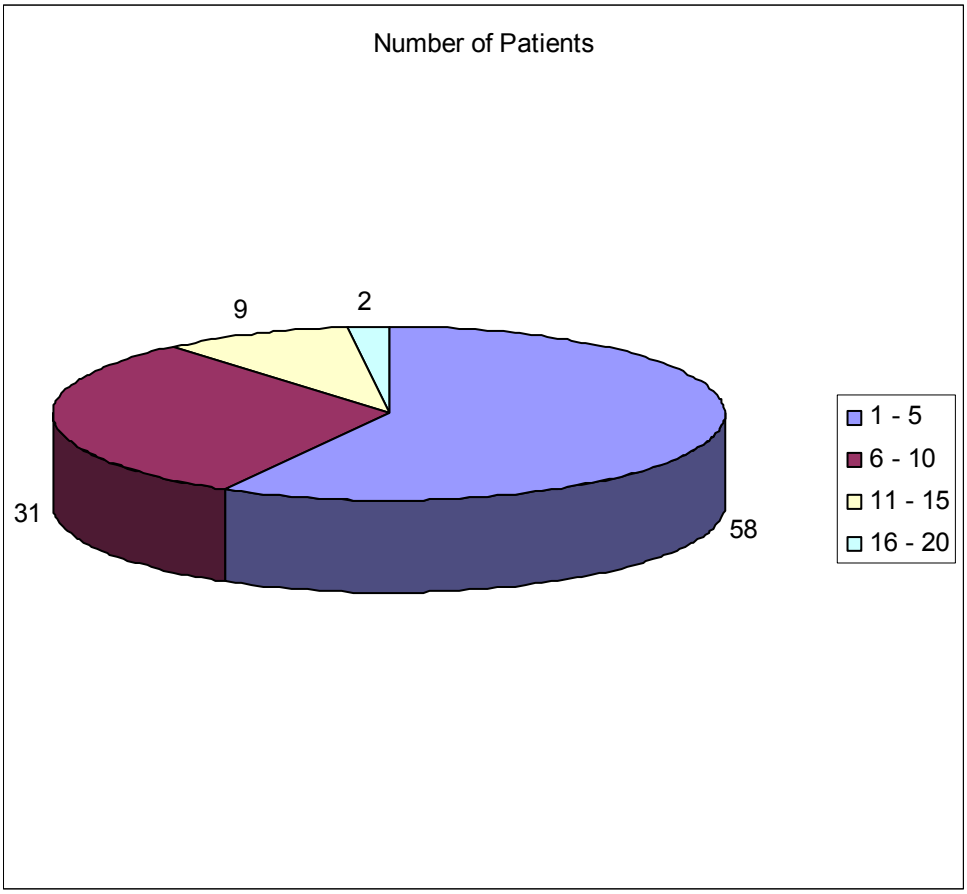
Note: ** Denotes significant

Duration of Infertility



In the study, majority of the patients in primary infertility presented with the duration of 1-5 years (67.1%) and in secondary infertility (55.6%) cases belongs to 6-10 years. In the primary infertility group, 8% presents with the duration of 1-2 years,14% cases 2-3 years,27% cases 3-5 years duration .In secondary infertility group,1% presented with 2-3 years,8% with 3-5 years duration. Totally 58% cases with 1-5 years, 31% cases 6-10 years, 9% cases 11-15 years and 2% cases belongs to 16-20 years of infertility.

Duration of Infertility

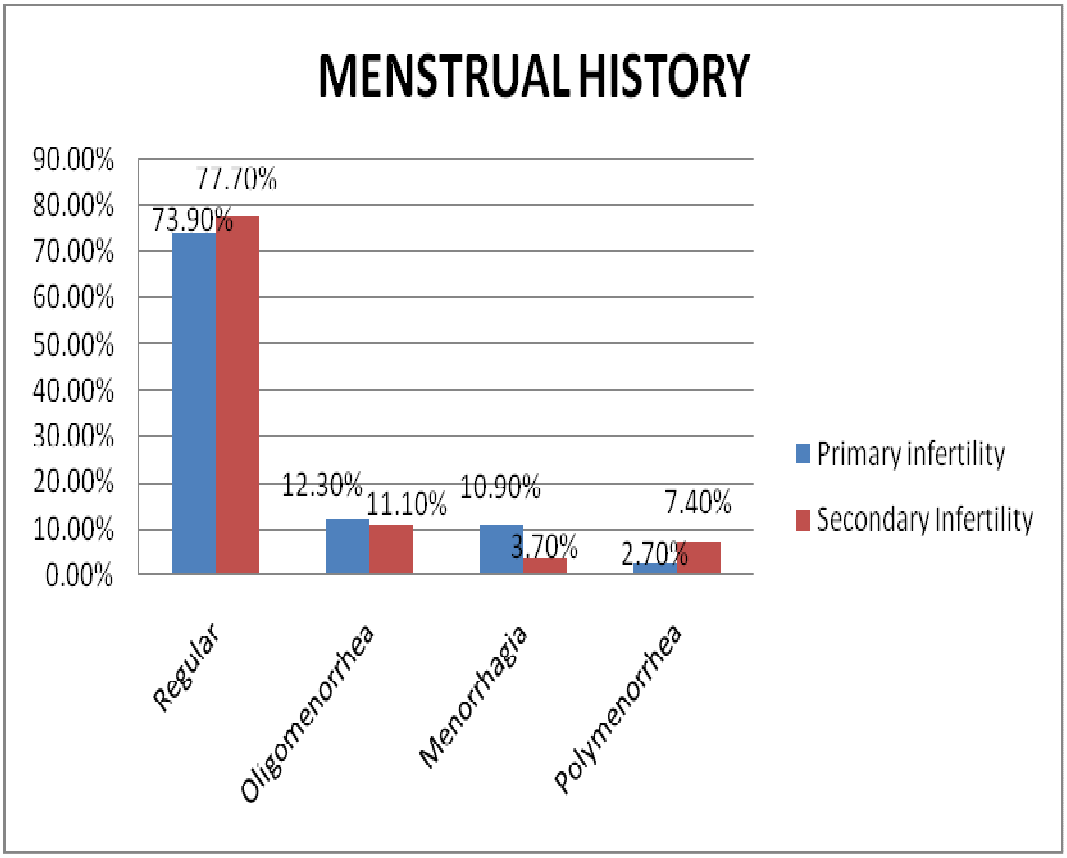


This pie chart shows total number of cases according to the duration of infertility

Table - 4

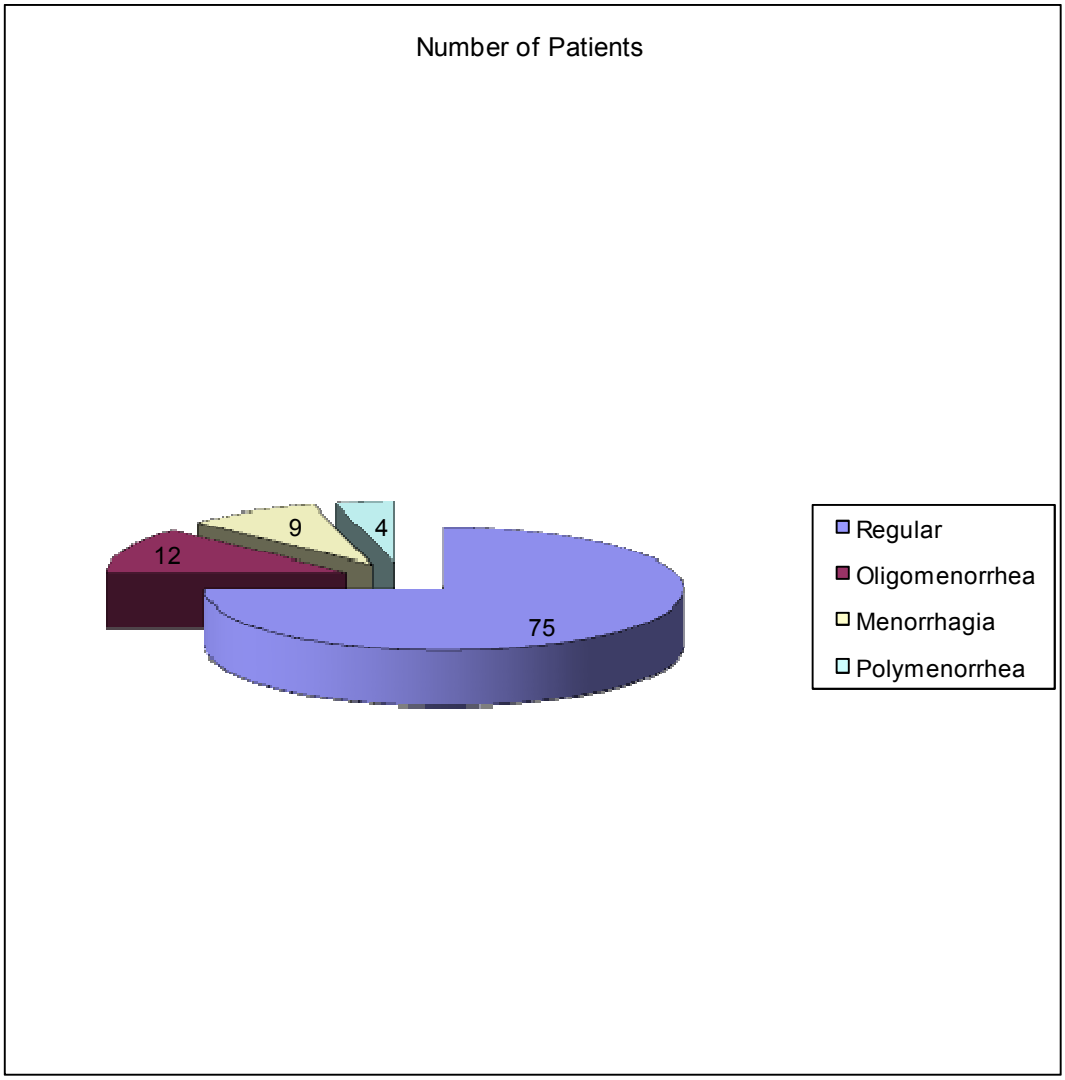
Menstrual History

Menstrual History	Primary infertility		Secondary Infertility		Total	
	Number of Patients	%	Number of Patients	%	Number of Patients	%
Regular	54	73.9%	21	77.7%	75	75%
Oligomenorrhea	9	12.3%	3	11.1%	12	12%
Menorrhagia	8	10.9%	1	3.7%	9	9%
Polymenorrhea	2	2.7%	2	7.4%	4	4%
Total	**73**	**100%**	**27**	**100%**	**100**	**100%**



In the study, majority of the patients (75%) in both the groups found to have regular menstrual history, 12% with oligomenorrhea, 9% menorrhagia, and 4 % of them have polymenorrhea.

Menstrual History

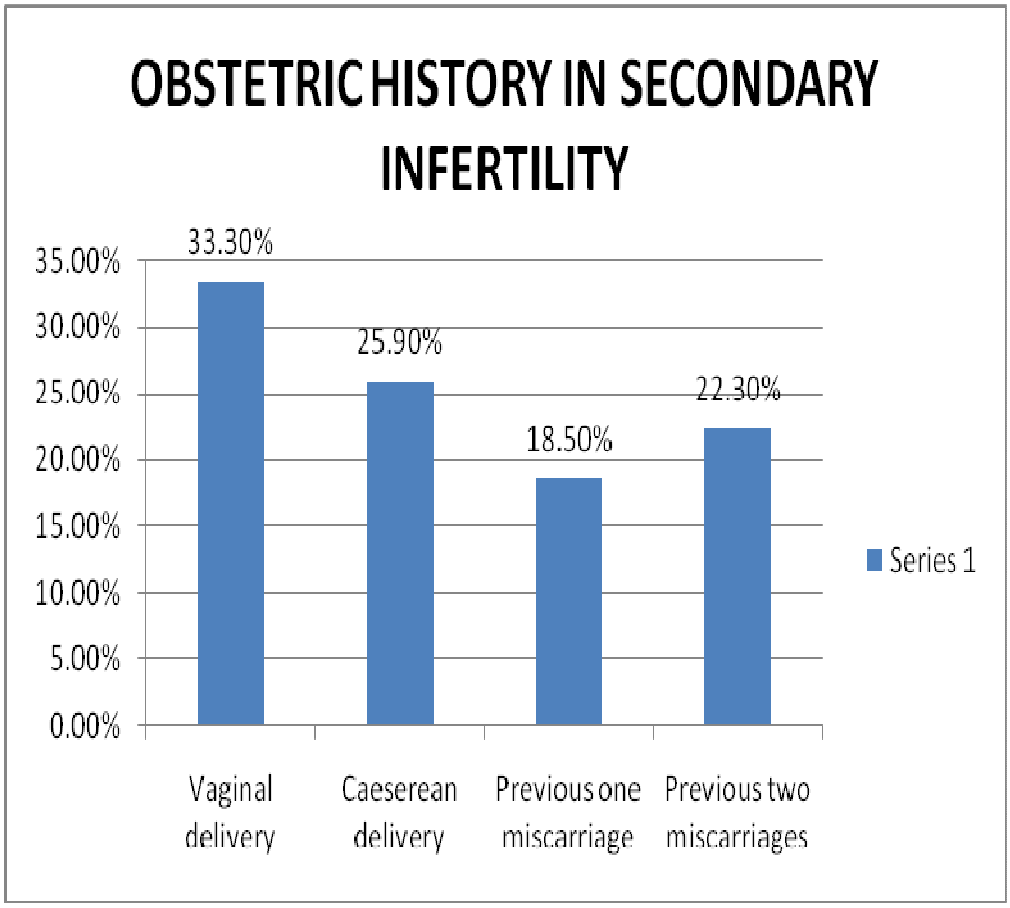


This pie chart shows distribution of cases according to the menstrual History.

Table- 5

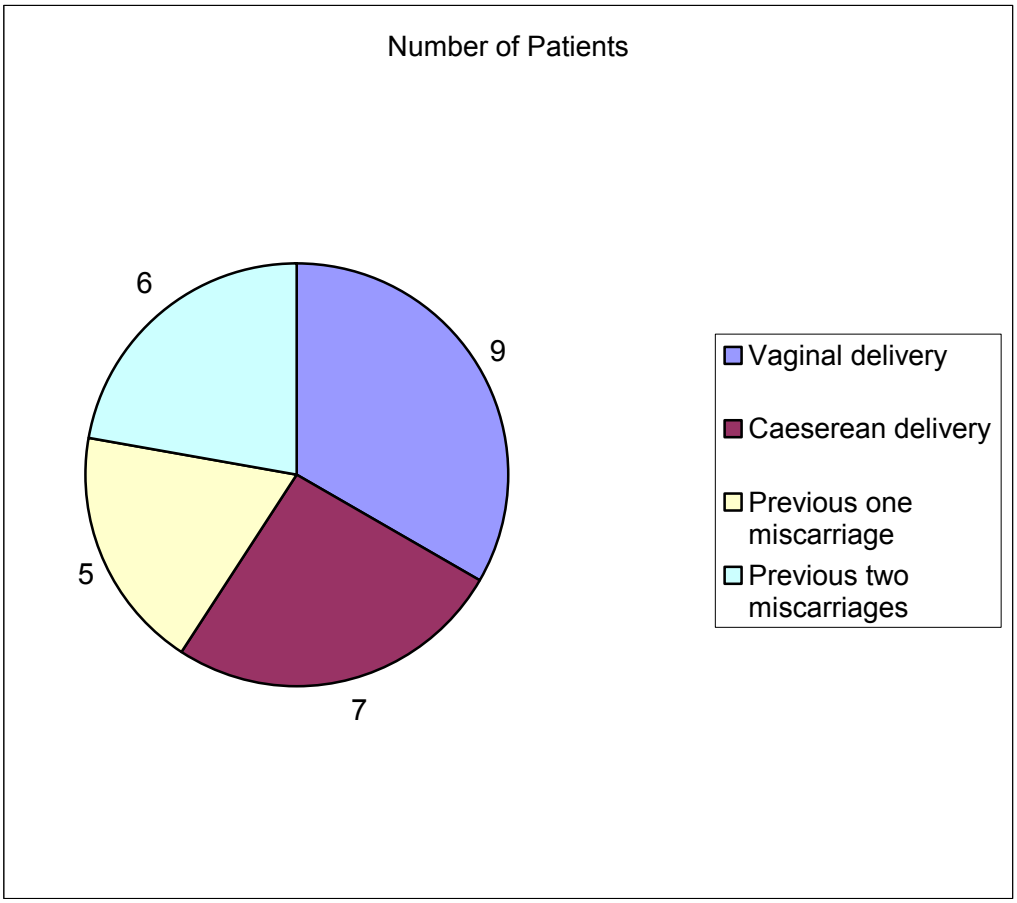
Obstetric history in secondary infertility

Obstetric History	Number of Patients	%
Vaginal delivery	9	33.3%
Caeserean delivery	7	25.9%
Previous one miscarriage	5	18.5%
Previous two miscarriages	6	22.3%
Total	**27**	**100%**



In our study, 33,3% cases of secondary infertility presented with vaginal delivery, 25.9% Caesarean delivery, 22.3% of them have previous two miscarriages and 18.5% have previous one miscarriage.

Obstetric history in secondary infertility



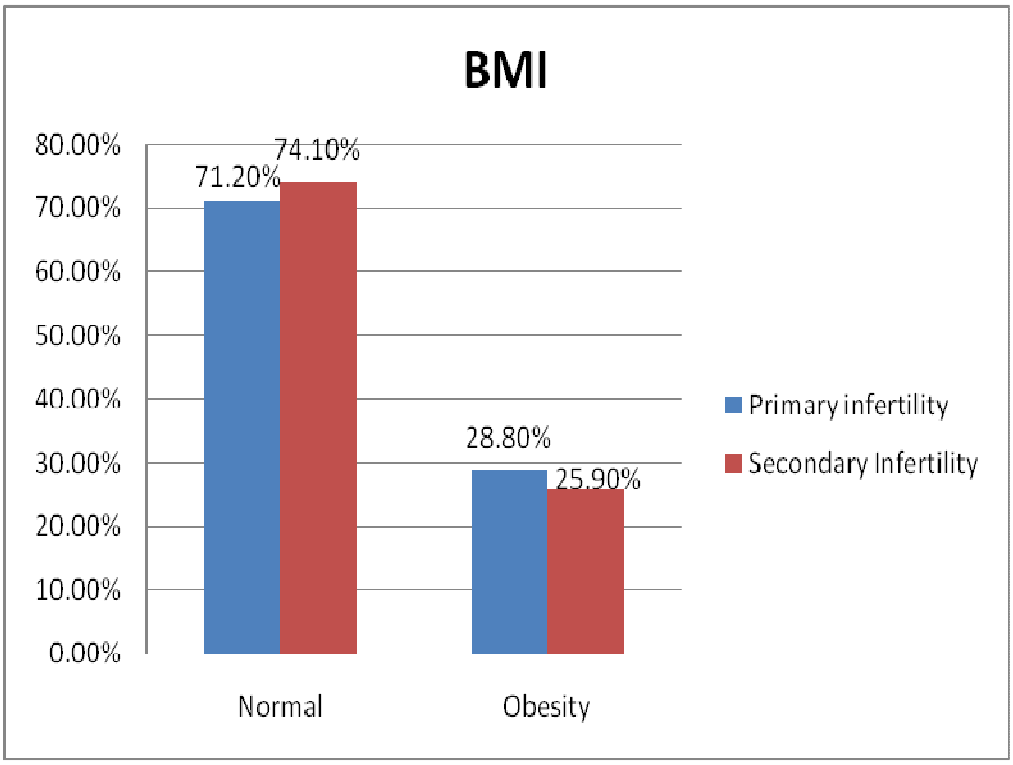
This pie chart shows distribution of obstetric history in secondary Infertility group .

Table - 6

Body Mass Index (BMI)

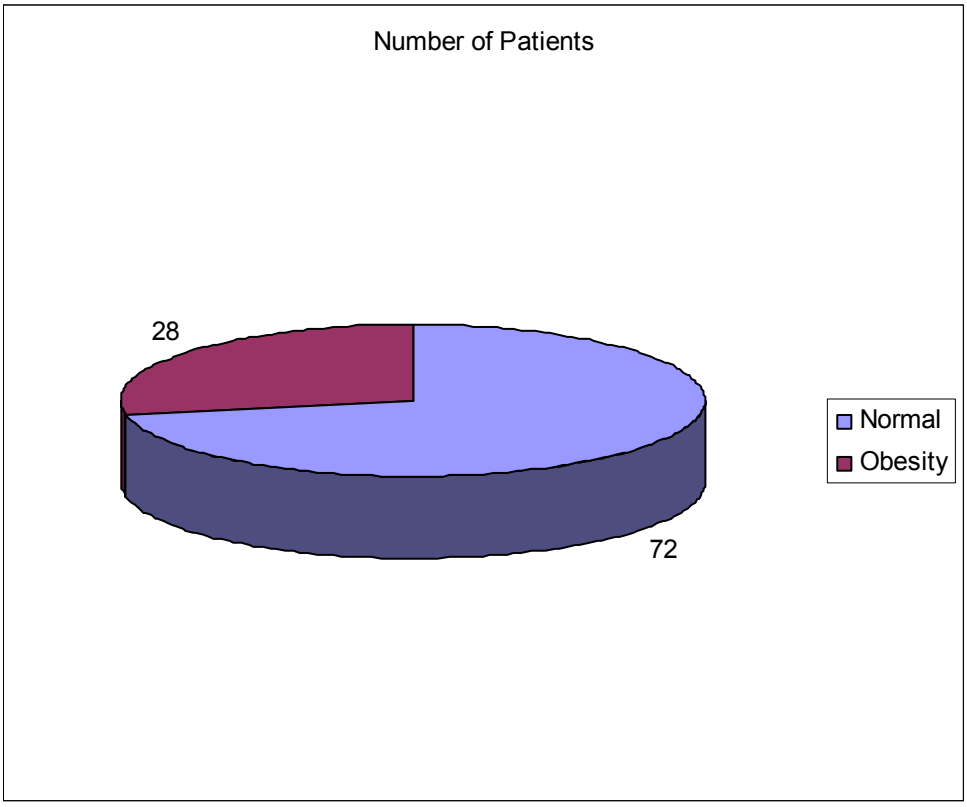
BMI	Primary infertility		Secondary Infertility		Total		P value
	Number of Patients	%	Number of Patients	%	Number of Patients	%	
Normal	52	71.2%	20	74.1%	72	72%	< **0.001****
Obesity	21	28.8%	7	25.9%	28	28%	
Total	73	100%	27	100%	100	100%	

Note: ** Denotes significant



In the study, 71.2% of primary infertility group found to have normal BMI, 28.8% have obesity. 74.1% of secondary infertility group with normal BMI, 25.9% obesity.

Body Mass Index (BMI)



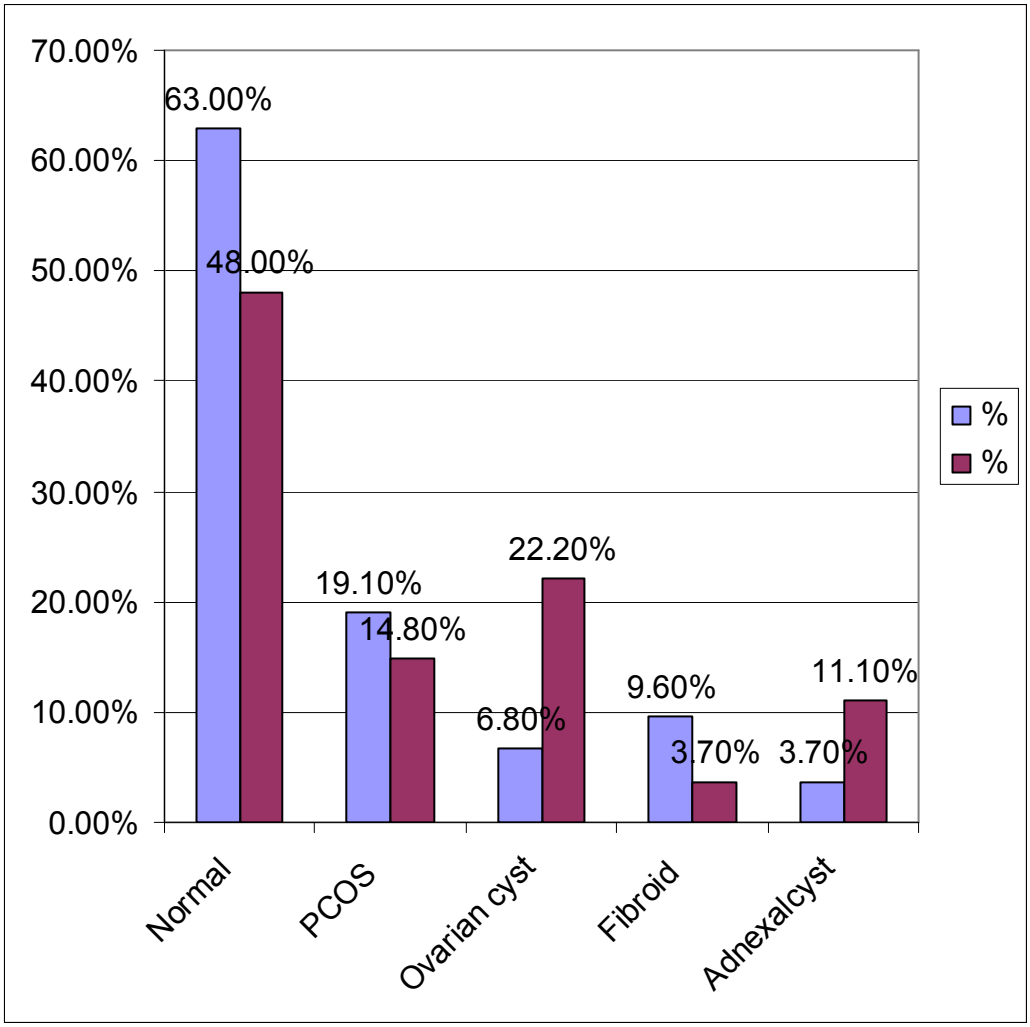
This pie chart shows total number of cases according to the body mass index (BMI).

Table - 7

USG findings

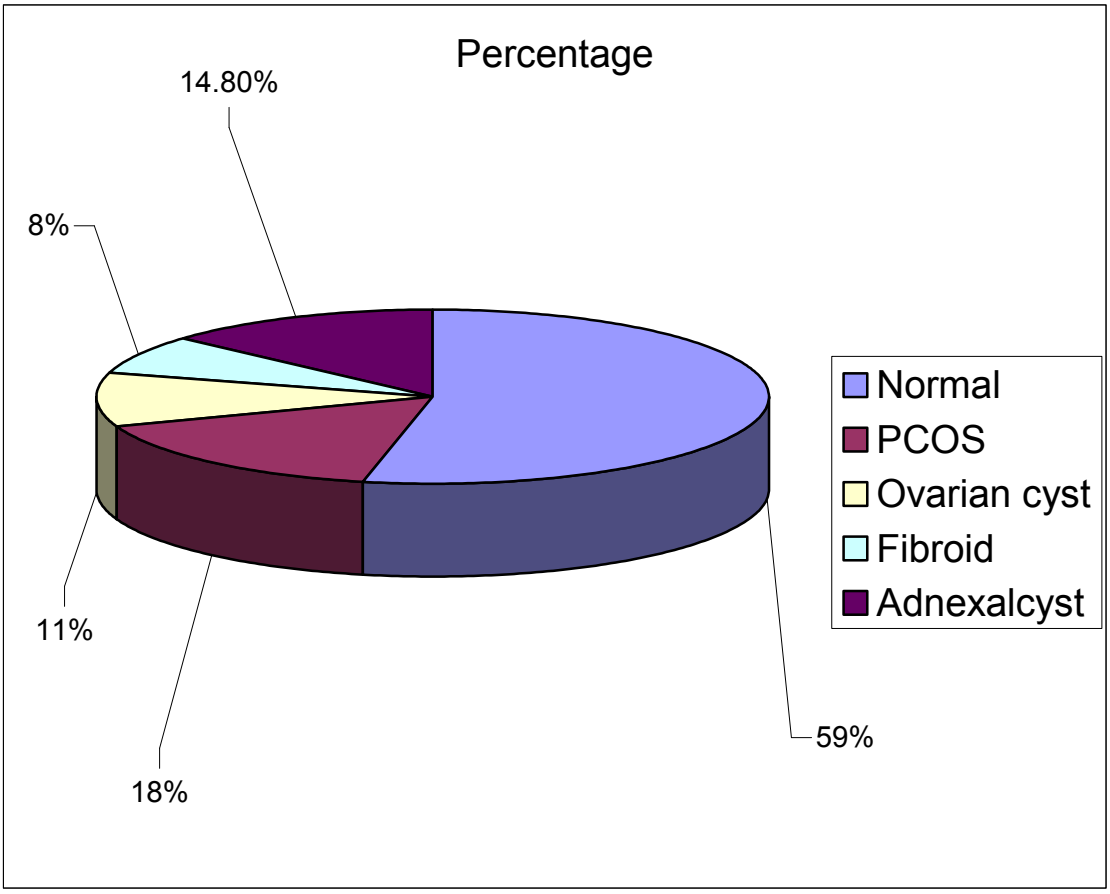
USG Finding	Primary infertility		Secondary Infertility		Total	
	Number of Patients	%	Number of Patients	%	Number of Patients	%
Normal	46	63.0%	13	48.0%	59	59%
PCOS	14	19.1%	4	14.8%	18	18%
Ovarian cyst	5	6.8%	6	22.2%	11	11%
Fibroid	7	9.6%	1	3.7%	8	8%
Adnexalcyst	1	3.7%	3	11.1%	4	14.8
Total	73	100%	27	100%	100	100%

USG findings



In our study, out of 100 cases, 59 patients found to be normal USG findings, 18% have PCOS, 11% ovarian cyst , 8% of them with fibroid uterus, and 4% adnexal cyst.

USG Findings

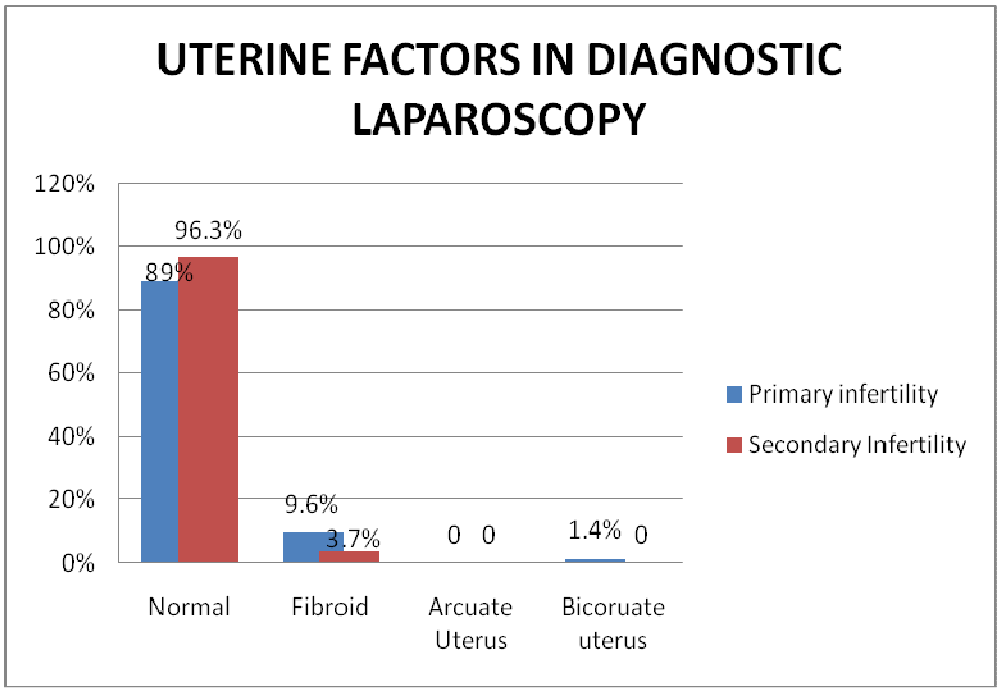


This pie chart shows total number of cases according to the ultrasound findings.

Table - 8

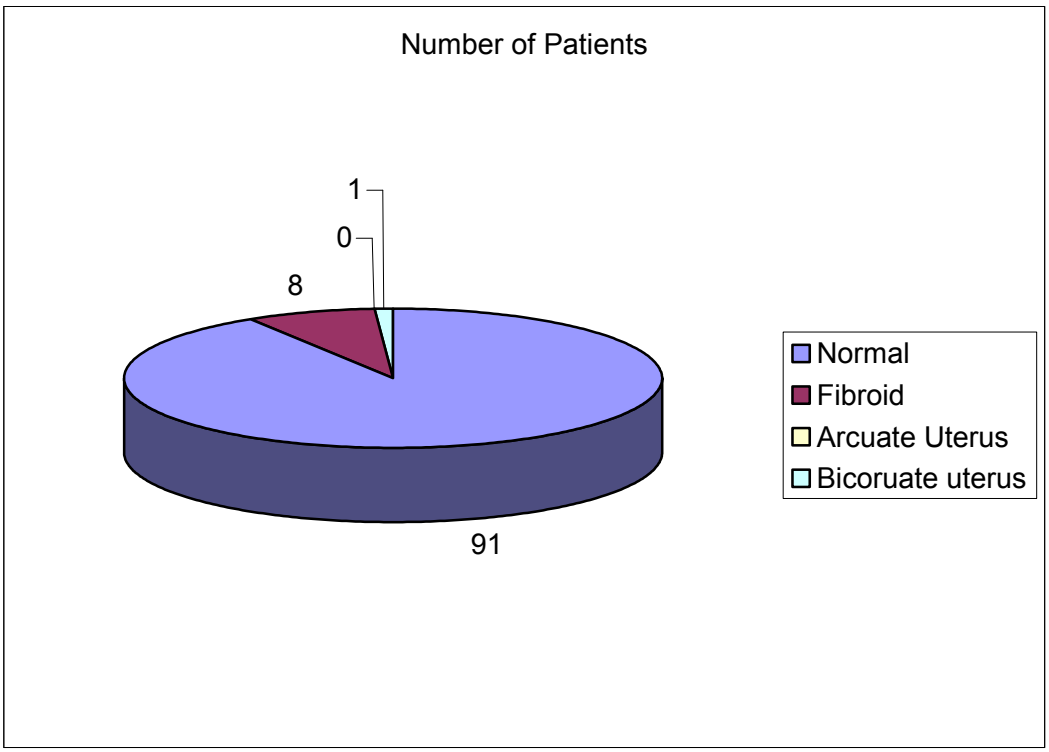
Uterine factors in Diagnostic Laparoscopy

Uterine factor	Primary infertility		Secondary Infertility		Total	
	Number of Patients	%	Number of Patients	%	Number of Patients	%
Normal	65	89%	26	96.3%	91	91%
Fibroid	7	9.6%	1	3.7%	8	8%
Arcuate Uterus	-	-	-	-	-	-
Bicoruate uterus	1	1.4%	-	-	1	1%
Total	73	100%	27	100%	100	100%



In our study, uterine factors accounted for 9% of causes of infertility, out of which 8% cases presented with fibroid uterus. Fibroid uterus more commonly found in primary infertility group. One case of primary infertility with bicornuate uterus.

Uterine factors in Diagnostic Laparoscopy



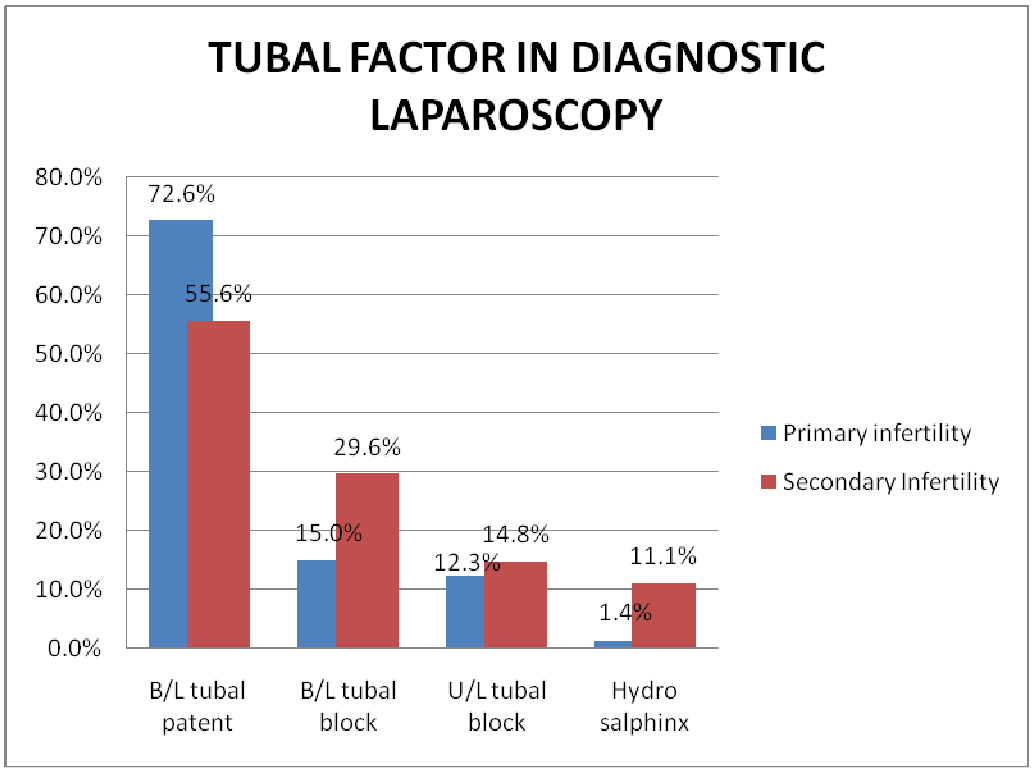
The above pie chart shows total number of uterine factors diagnosed during diagnostic laparoscopy.

Table - 9

Tubal factor in Diagnostic Laparoscopy

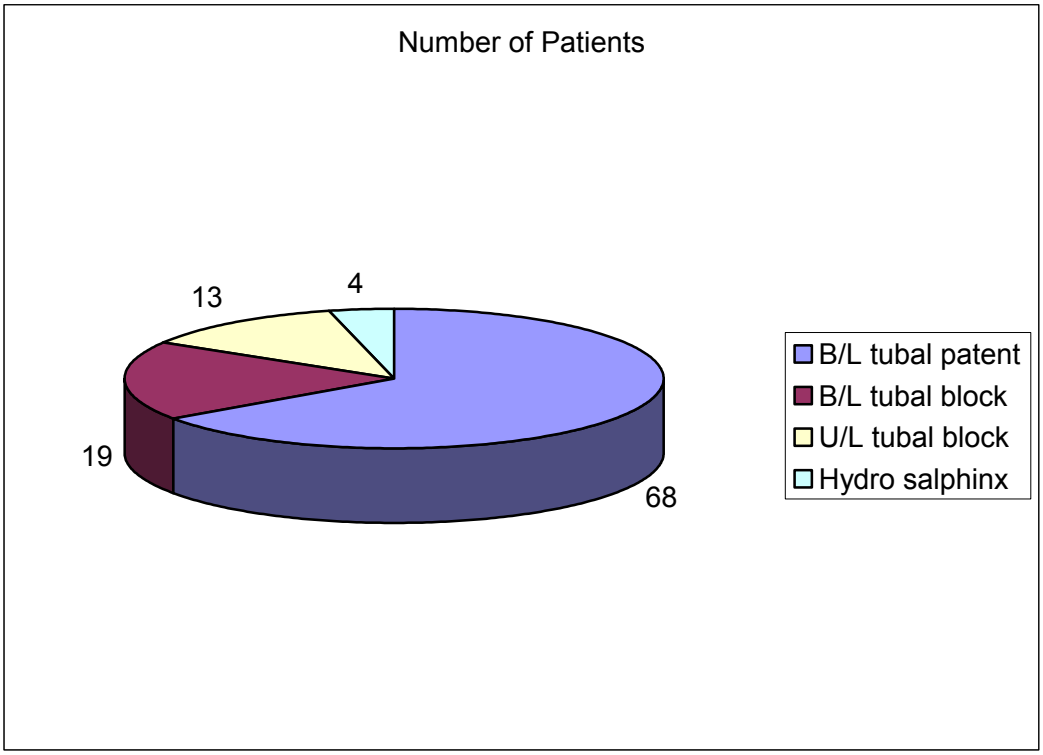
Tubal factor	Primary infertility		Secondary Infertility		Total		P Value
	Number of Patients	%	Number of Patients	%	Number of Patients	%	
B/L tubal patent	53	72.6%	15	55.6%	68	68	
B/L tubal block	11	15.0%	8	29.6%	19	19	**< 0.001****
U/L tubal block	9	12.3%	4	14.8%	13	13	
Hydro salphinx	1	1.4%	3	11.1%	4	4	

Note: ** Denotes significant



In the study, tubal factors accounted for 36% cases of infertility and 28.7% cases belongs to primary, 55.5% cases belongs to secondary infertility group. Totally 19% cases presented with bilateral tubalblock and 13% cases with unilateral tubal block, 4% Hydrosalphinx.

Tubal factor in Diagnostic Laparoscopy



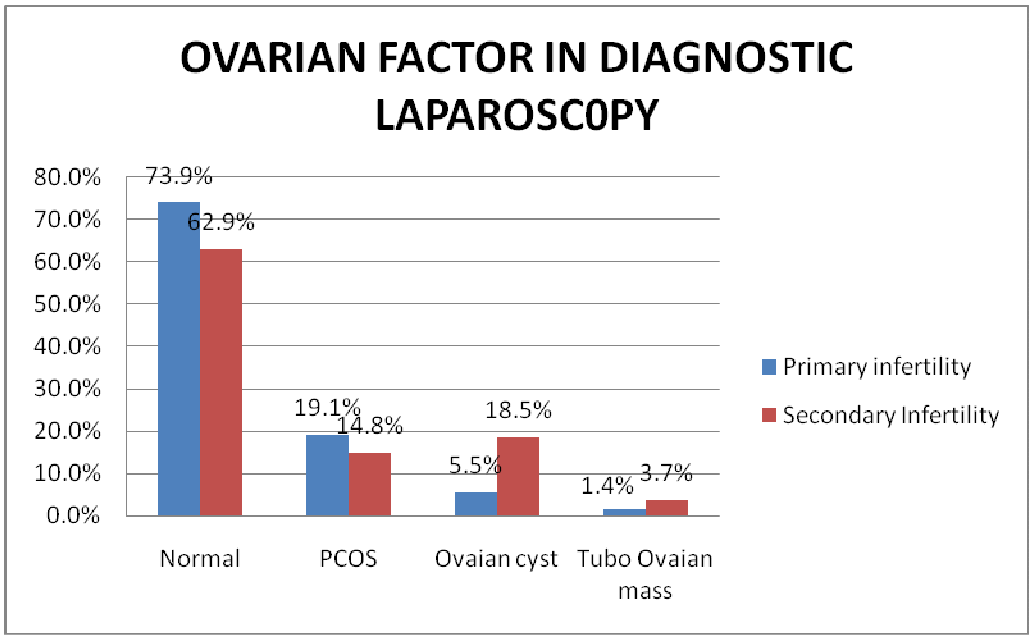
The above pie chart shows total number of tubal factors diagnosted during laparoscopy.

Table-10

Ovarian factor in Diagnostic Laparoscopy

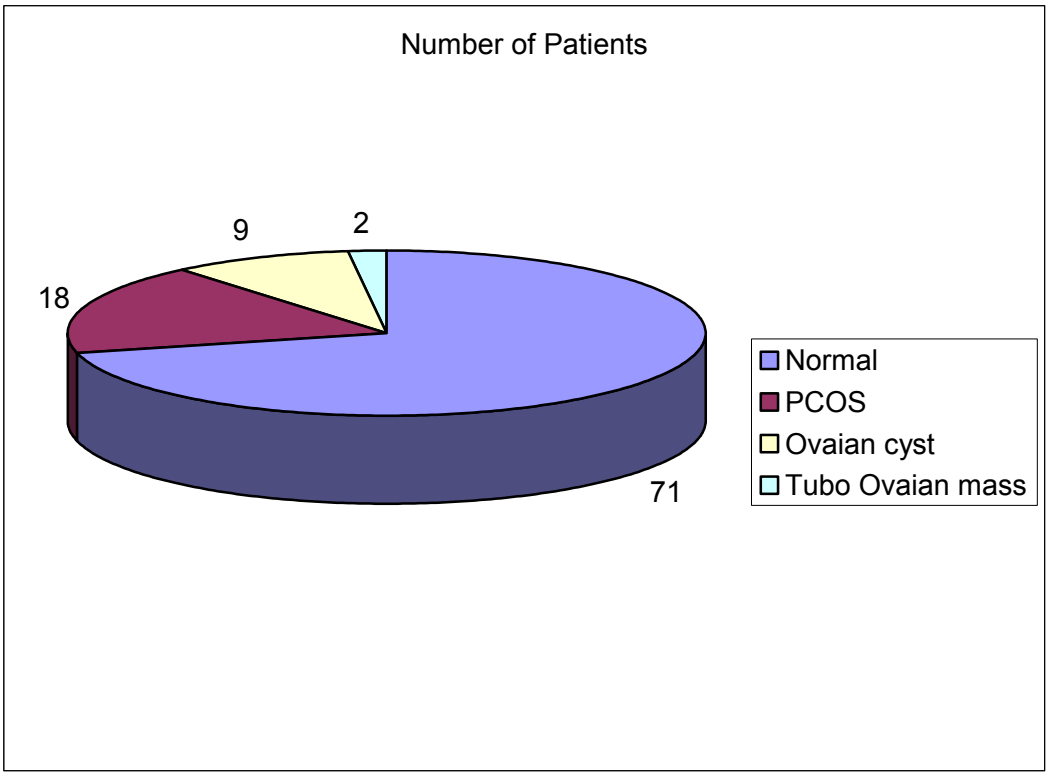
Ovarian factor	Primary infertility		Secondary Infertility		Total		P Value
	Number of Patients	%	Number of Patients	%	Number of Patients	%	
Normal	54	73.9%	17	62.9%	71	71%	
PCOS	14	19.1%	4	14.8%	18	18%	
Ovaian cyst	4	5.5%	5	18.5%	9	9%	< **0.001****
Tubo Ovaian mass	1	1.4%	1	3.7%	2	2%	

Note: ** Denotes significant



As shown in table, ovarian factors responsible for 29% cases, of which majority of them have PCOS (18%). In primary infertility 19.1% PCOS, 5.5% ovariancyst, 1.4% Tuboovarian mass present. In secondary infertility group 14.8% PCOS, 18.5% ovariancyst, 3.7% Tuboovarian mass present.

Ovarian factor in Diagnostic Laparoscopy



This pie chart shows total number of ovarian factors diagnosed during Laparoscopy.

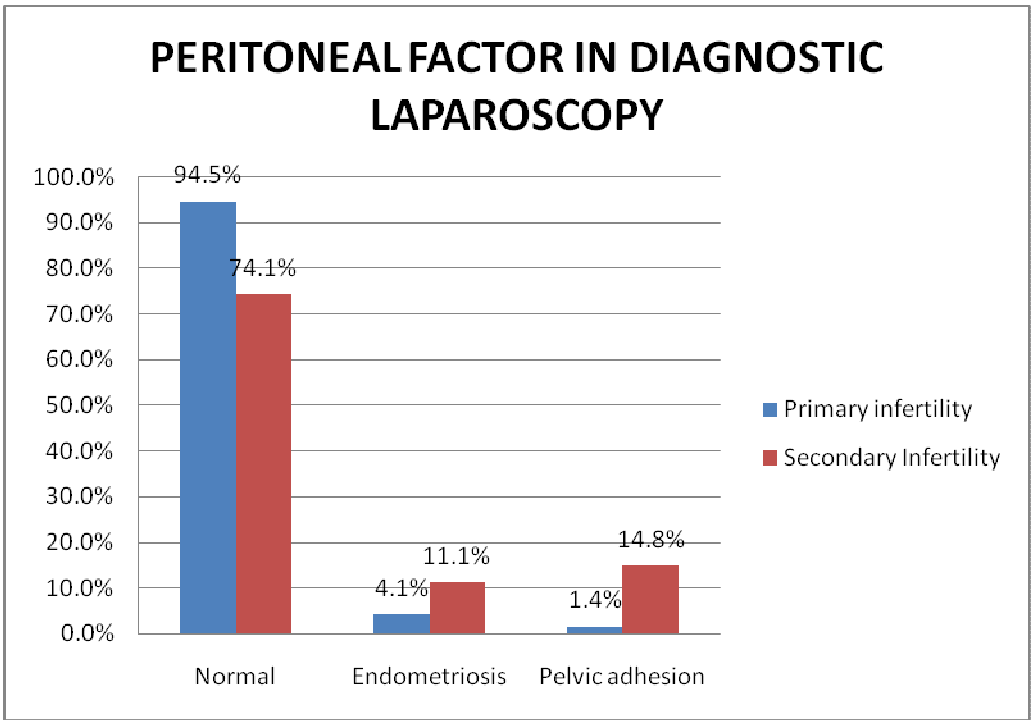
Table- 11

Peritoneal Factor In Diagnostic Laparoscopy

Peritoneal factor	Primary infertility		Secondary Infertility		Total	
	Number of Patients	%	Number of Patients	%	Number of Patients	%
Normal	69	94.5%	20	74.1%	89	89%
Endometriosis	3	4.1%	3	11.1%	6	6%
Pelvic adhesion	1	1.4%	4	14.8%	5	5%
Total	73	100%	27	100%	100	100%

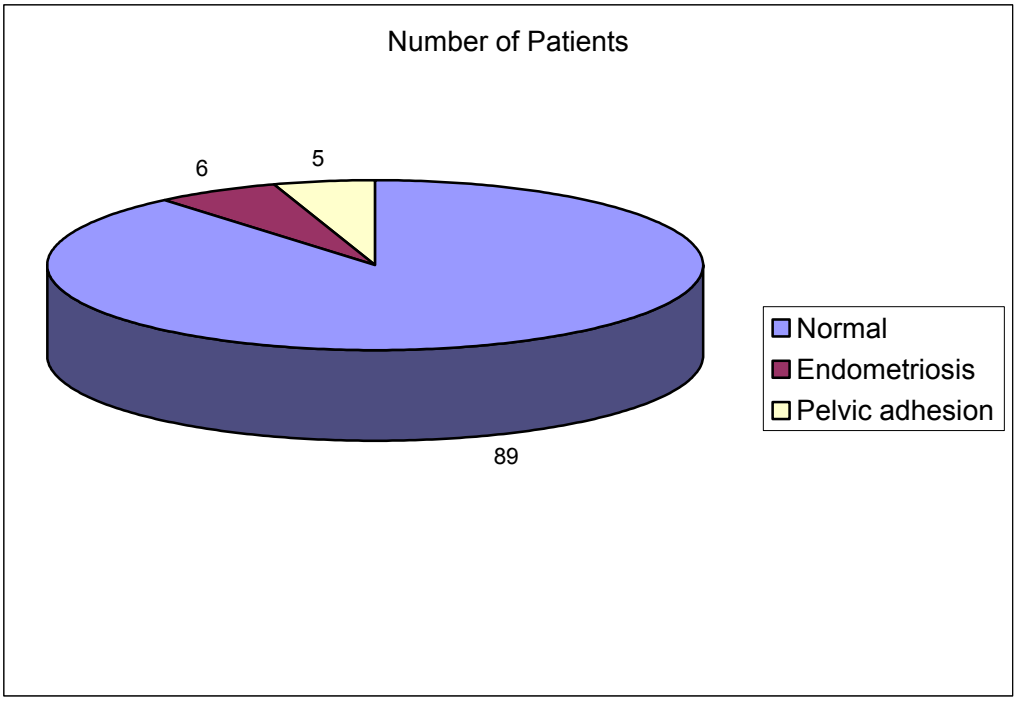
P – Value - < 0.001**

** Indicates Significant



In our study, peritoneal factors responsible for 11% of total cases. In primary infertility 4.1% presented with endometriosis, 1.4% pelvic adhesion present. In secondary infertility 14.8% pelvic adhesion, 11.1% endometriosis.

Peritoneal Factor In Diagnostic Laparoscopy

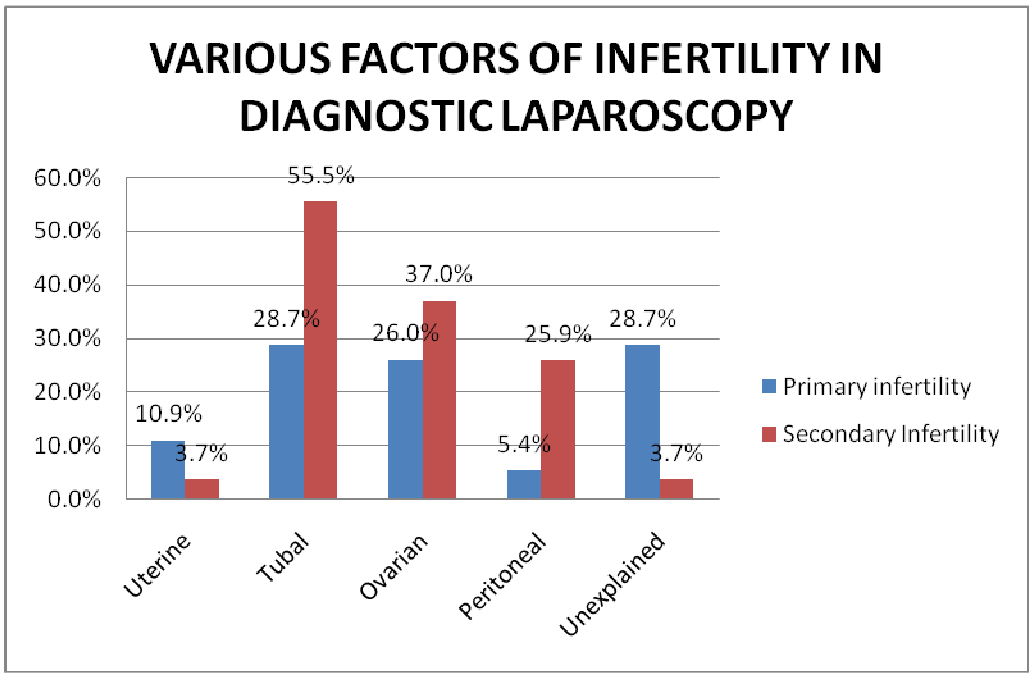


The above pie chart shows total number of peritoneal factors diagnosed during laparoscopy.

Table - 12

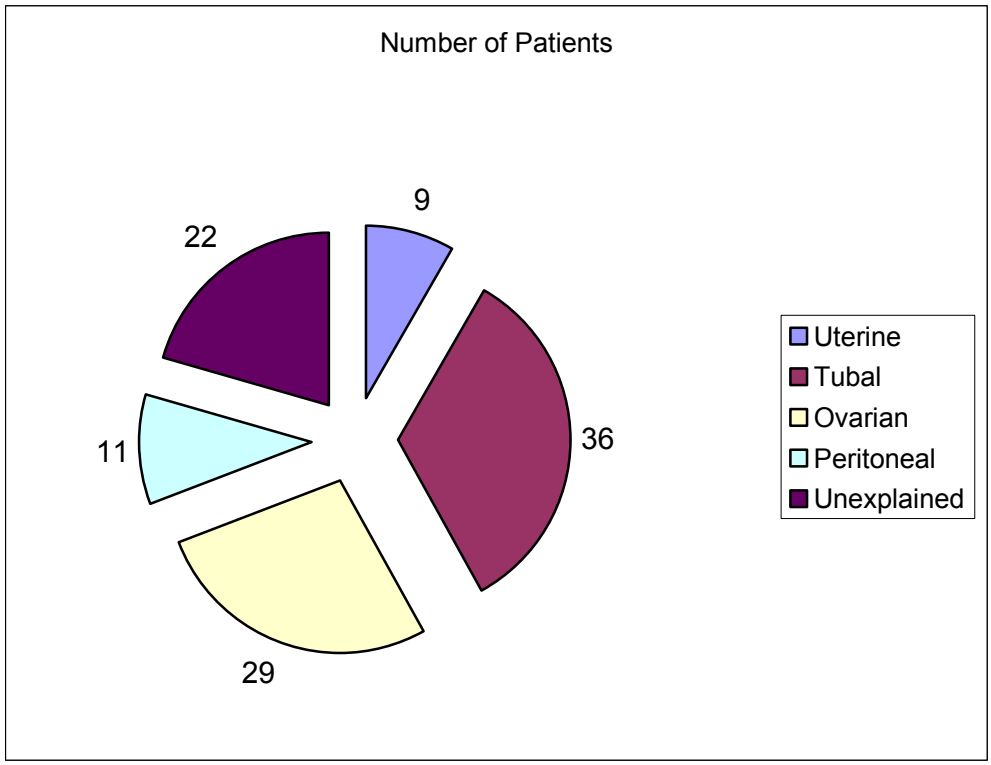
Various Factors of Infertility In Diagnostic Laparoscopy

Various factors	Primary infertility		Secondary Infertility		Total	
	Number of Patients	%	Number of Patients	%	Number of Patients	%
Uterine	8	10.9%	1	3.7%	9	9%
Tubal	21	28.7%	15	55.5%	36	36%
Ovarian	19	26.0%	10	37.0%	29	29%
Peritoneal	4	5.4%	7	25.9%	11	11%
Unexplained	21	28.7%	1	3.7%	22	22%



In our study it has been found, that tubal factors responsible for the most common cause (36%) in both primary (28.7%) and secondary (55.5%) in fertility group. Followed by ovarian factors (29%), peritoneal (11%) and uterine factors (9%). In 22 cases, there were no detectable pathology at Laparoscopy. Total number of cases is not shown in the table as many patients have more than one pathology at Laparoscopy.

Various Factors of Infertility In Diagnostic Laparoscopy

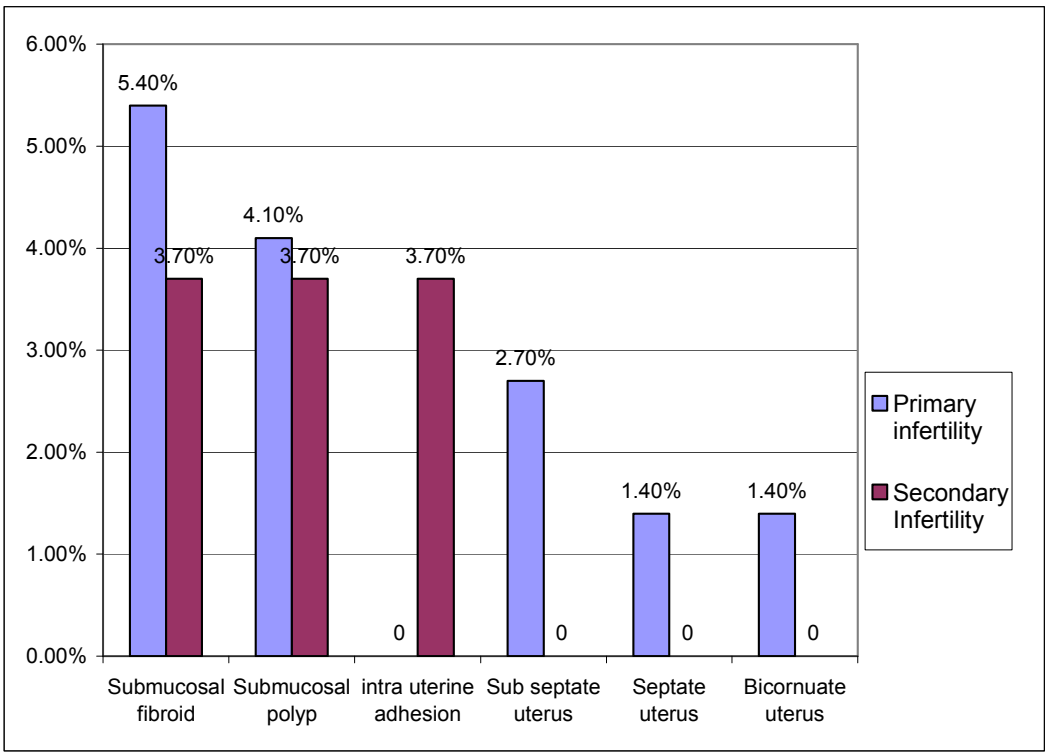


This pie chart shows total number of various factors diagnosed during Laparoscopy.

Table - 13

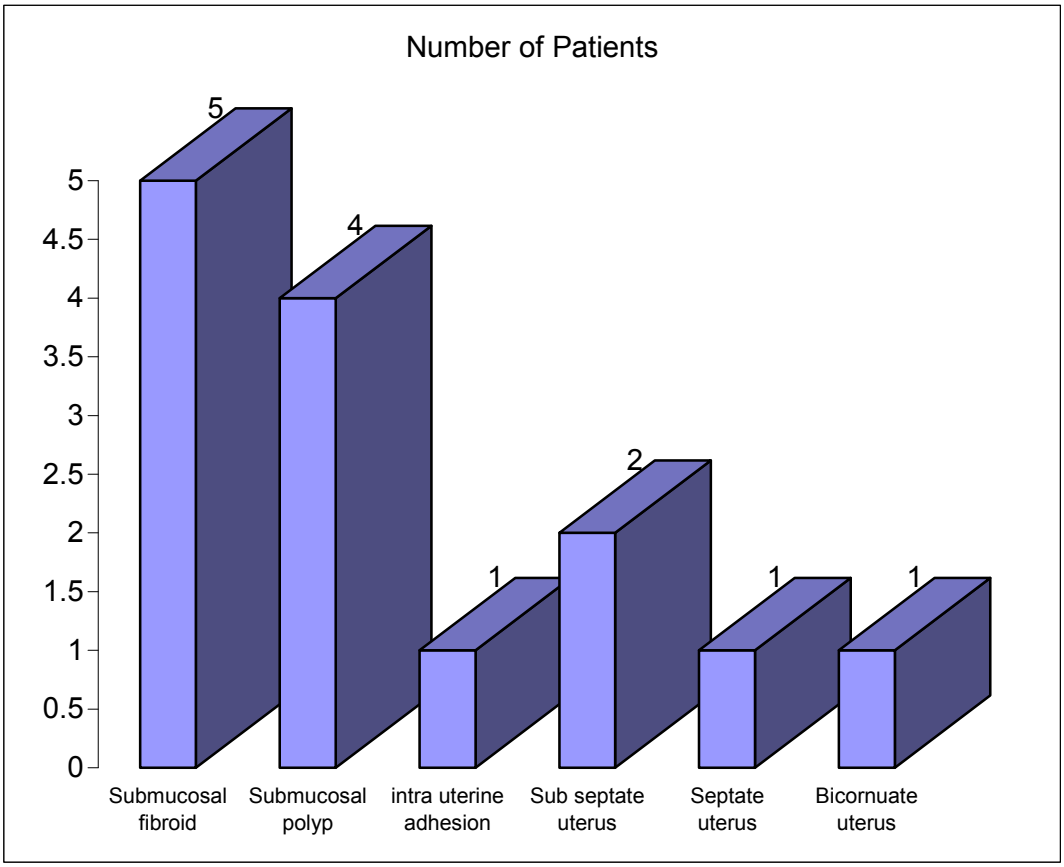
Causes of Infertility in Diagnostic Hysteroscopy

Causes	Primary infertility		Secondary Infertility		Total	
	Number of Patients	%	Number of Patients	%	Number of Patients	%
Submucosal fibroid	4	5.4%	1	3.7%	5	5%
Submucosal polyp	3	4.1%	1	3.7%	4	4%
intra uterine adhesion	-	-	1	3.7%	1	1%
Sub septate uterus	2	2.7%	-	-	2	2%
Septate uterus	1	1.4%	-	-	1	1%
Bicornuate uterus	1	1.4%	-	-	1	



In our study 5% cases found to have submucous fibroid uterus, 4% submucous polyp, 2% subseptate uterus, 1% Septate uterus, 1% intrauterine adhesions and 1% bicornuate uterus present.

Causes of Infertility in Diagnostic Hysteroscopy



The above bar chart shows total number of various causes diagnosed during diagnostic hysteroscopy.

DISCUSSION

Diagnostic hysteroscopy provides a reliable information in evaluation of uterinecavity and detection of intrauterine diseases.Mean prevalence of uterine malformation in general population is 4.3%,in infertility is 3.5% and in recurrent pregnancy loss 13%.The incidence of uterine anomaly is 7.6%.subseptate and septate uterus is the most common uterine malformation in our study,which is undiagnosed by prior USG.septate uterus is the most common uterine anomaly associated with increased reproductive failure rates.

The reproductive performance of uncorrected septum is poor like 80% pregnancyloss,10%preterm delivery,10% term delivery.pregnancy outcome improved after surgical correction in to 80%term,5% preterm delivery,15% pregnancy loss. complication rate of diagnostic hysteroscopy is low as 0.012%. In view of low complication, less time consuming hysteroscopy could be done in all infertility patients under going diagnostic laparoscopy.

Diagnostic laparoscopy is the standard method in diagnosis of tubal, peritoneal pathologies, endometriosis. The mechanism of infertility in fibroid includes cornual fibroid which involves the interstitial segment of fallopian tube and dysfunctional uterine contractility interfering with

ovum or sperm transport, embryo implantation, poor regional blood flow to the endometrium.

The result of our study is compared with others studies .

Table -14

Type of infertility	Shokeir TA.et.al. (2004)	Boricha YG. et al (2011)	Present study
Primary	49%	70%	73%
secondary	36.1%	30%	27%

In the present study out of 100 cases of infertility, primary infertility is 73% and secondary infertility is 27%. Similar result was found in Boricha YG.et.al. where as in Shokeir TA .et.al[34] primary infertility was 49% and secondary infertility 36.1%.(Table-14)

In our study majority of patients of primary infertility (43%) in the age group of 26-30years and secondary infertility (48.1%) in the age of 31- 35years. BorichaY.G et al shows common age group in primary infertility was 21-25years, in secondary infertility was 26-30years. Present study shows primary infertility group more commonly present with 1-5 years duration(67.1%) and secondary infertility present with 6-10 years duration(55.6%). BorichaY.G et al found that both groups

presented in 4-7 years duration. Majority of the patients in present study found to have regular menstrual cycle(75%), rest of them have irregular menstrual cycle. 28.8% of primary infertility group presented with obesity, where as 25.9% of secondary infertility group were obese in our study.

Table -15

Uterine factors in laparoscopy

Factors	Sajida et al (2009)	Godinjak Z et al (2008)	Present study
Fibroid uterus	4.8%	8.6%	8%
Uterine anomaly	6.45%	36.5%	1%

From the table -15 it has been found that uterine pathology in 9% cases , Among this fibroid uterus is 8% . In fibroid uterus distortion of endometrial cavity and impaired gamete transport lead to adverse pregnancy outcome.

Godinjak Z et al (2008) found fibroid in 8.6%, uterine anomaly in 36.5% cases. Sajida et.al(2009) found fibroid in 4.8%, uterine anomaly in 6.45% cases.

Table -16

Tubal factors in laparoscopy

Factors	Sajida et al (2009)	Godinjak Z et al (2008)	Present study
B/L patent	64.5%	88%	68%
B/L block	16.25	5%	19%
U/L block	19.3%	8.33%	13%
Hydrosalphinx	-	-	4%

In the present study we have found tubal factors lead to maximum number of infertility. Tubal block was present in 32% cases and hydrosalphinx in 4% cases. This may be due to increase incidence of pelvic inflammatory diseases, chronic infections and genital tuberculosis. Tubal damage increases with the number and severity of episodes of PID. Sajida et.al(2009) found tubal block in 35.5% whereas in Godinjak Z et al (2008) found tubal block in 13.3%. Hydrosalphinx not found in both these studies.

Table – 17

Ovarian factors

Factors	Sajida et al(2009)	Godinjak Z et al (2008)	Present study
PCOS	19.35%	-	18%
Ovarian cyst	4.8%	4.44%	9%
TO mass	-	-	2%

In the present study ovarian factors accounts for 29% cases. Among these PCOS is the most common cause in 18% cases followed by ovarian cyst in 9% , TO mass in 2% cases. In PCOS anovulation, failure of corpusluteum development , decreased progesterone and hyperandrogenism lead to infertility.

Sajida et al(2009) found PCOS 19.35% and ovarian cyst in 4.8% cases. Godinjak Z et al (2008) found only ovarian cyst in 4.44% cases.

Table-18

Peritoneal factors

Factors	Sajida et al (2009)	Godinjak Z et al (2008)	Present study
Endometriosis	8%	14.16%	6%
Pelvic adhesions	11.2%	11.11%	5%

In the present study, it has been found that Endometriosis in 6%,Pelvic adhesion in 5% cases.Pelvic adhesions canbe dueto infection or previous surgeries.It leads to peritubal and omental adhesions which produces distortion of pelvic anatomy.

Sajida et al found Endometriosis in 8%,Pelvic adhesion in 11.2% cases. Godinjak Z et al found endometriosis in 14.16%, Pelvic adhesion in 11.11% cases.

Table-19

Various factors of infertility in laparoscopy

Factors	Sajida et al	Godinjak Z et al	Present study
Uterine	4.8%	8.6%	9%
Tubal	35.4%	13.3%	36%
Ovarian	24.1%	6.6%	29%
Peritoneal	19.2%	25.2%-	11%
Unexpained	16.5%	-	22%

In the present study, it reveals tubal factors (36%) are the most common cause of infertility, followed by ovarian in 29%, peritoneal in 11% and uterine in 9% of cases. The studies conducted by Sajida et al also found tubal factor as an commonest cause, Godinjak Z et al found peritoneal factor is an commonest cause.

Table-20

Various causes of infertility in hysteroscopy

causes	Sajida et al	Godinjak et al	Present study
Submucous fibroid	1.6%	3.05%	5%
Submucous polyp	9.6%	7.22%	4%
Intrauterine adhasion	3.2%	0.83%	1%
Uterine anomaly	12.9%	5.27%	4%

In the present study submucous fibroid (5%) is the most common pathology detected by hysteroscopy, it causes distortion of the endometrial cavity and implantation failure.submucous fibroid present in 4%,uterine anomalies 4%,intrauterine adhesion 1% of cases.Uterine anomalies which was undiagnosed by prior USG and other routine investigations also diagnosed during diagnostic hysteroscopy.Uterine anomalies usually causes recurrent pregnancy loss and pregnancy outcome dramatically improved after surgical correction in these patients.

Godinjak Z et al[35] found endometrial polyp in 7.22%,Sajida et al[36] found uterine anomalies in12.9% are the most common causes detected in hysteroscopy.

SUMMARY

Laparoscopy and hysteroscopy plays a significant role in the diagnosis of female infertility. It helps in the diagnosis of various causes of infertility, which were unrevealed by other investigations.

- Our study was conducted in 100 cases of infertility patients attending **outpatient Department of Govt. Kasturba Gandhi Hospital, Madras Medical College,** Chennai from September-2012 to August-2014.

- Primary infertility was the most common reason for diagnostic hysterolaparoscopic evaluation as 73% cases presented with primary infertility. Secondary infertility was present in 27% cases.

- Majority of primary infertility group (43%) belonged to 26 -30 years of age and 48.1% of secondary infertility cases presented in 31-35 years of age.

- 67.1% of primary infertility patients presented with 1-5 years duration and 55.6% of secondary infertility cases with 6-10 years duration of infertility.

- 22% of cases had normal findings in diagnostic laparoscopy, whereas 78% cases presented with pathological findings.

- Diagnostic hysteroscopy shows abnormal findings in 14% cases. Submucous fibroid was presented in 5%,submucous polyp in 4%,intrauterine adhesion in1% of infertility patients. Uterine anomalies was presented in 4% cases, of which subseptate uterus in 2%, septate uterus in 1%,bicornuate uterus in 1% cases.

- On diagnostic laparoscopy, majority of the patients (91%) had normal uterus. Fibroid was diagnosed in 8%, and Bicornuate uterus in 1% of patients with infertility.

- In our study ,tubal factors was found to be the most common cause in 36% of infertility. During laparoscopic chromopertubation, bilateral tubal block was present in19%,unilateral block in 13%.Hydrosalphinx diagnosed in 4% of case, which was present as adnexal cyst in ultrasound.

- Ovarian factors were diagnosed in 29% of cases,in our study. Pcos present in majority(18%) of the patients,ovarian cyst in 9%,Tubo ovarianmass in 2% of cases.
- Peritoneal factors found be present in 11% patients,out of which endometriosis seen in 6%,pelvic adhesion in 5% of cases.

- None of the patients had complications during the procedure except mild abdominal pain and minimal discomfort.

CONCLUSION

- From our study, it is concluded that the diagnostic hysteroscopy and laparoscopy is an **effective and safe tool in evaluation of female infertility.** It provides direct and magnified view of all pelvic organs.

- Diagnostic hysterolaparoscopy is an **"definitive daycare procedure"** in evaluation of infertility. It helps in the diagnosis of specific causes of infertility, which is not diagnosed by other investigations like hormonal study, USG and HSG.

- It is an **acceptable and feasible** procedure, because it has the benefit of shorter hospital stay, less post operative pain and quick return of routine activity.

- Diagnostic hysterolaparoscopy can be used as an **"ONETIME APPROACH"** by evaluation and therapeutic procedures can also be done in the same sitting as needed.

- From our study, we can conclude that combined diagnostic hysterolaparoscopy is the **gold standard** tool in the evaluation of female infertility.

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ABBREVIATIONS

B/L –Bilateral

U/L-Unilateral

CO_2 -carbon dioxide

CVS-Cardio vascular system

CNS-Central nervous system

DM-Diabetes mellitus

HT-Hypertension

GOPD-Gynaecology outpatient department

HCG-Human chorionic gonadotrophin

HSG-Hysterosalpingogram

IUCD-Intrauuterine contraceptive device

IUD-Intra uterine death

LH-Leutinising hormone

MRI-Magnetic resonance imaging

MTP-Medical termination of pregnancy

OCP-Oral contraceptive pills

PCOS-Polycystic ovarian syndrome

PID-Pelvic inflammatory disease

POD-Pouch of douglas

STD-Sexually transmitted disease

TB-Tuberculosis

TO MASS-Tubo ovarian mass

USG-Ultrasonography

ANNEXURE-I
PROFORMA

1. Name
2. Age
3. Address
4. Hospital I P No.
5. Date of examination
6. Occupation of Patient
7. Husband's Occupation
8. Socio-economic Status
9. Primary Infertility / Secondary Infertility
10. Duration of Infertility
11. Presenting Complaints

    - Duration
    - Inability to conceive
    - Pain abdomen
    - White discharge per vagina
    - Urinary disturbances —Increased frequency / Dysuria / Burning sensation
    - Psychotic problems
    - Others

12.Menstrual history

- Age of Menarche
- Present Cycles
    - Duration of cycles
    - Flow in days
    - Dysmenorrhoea
    - Clots
    - Intermenstrual bleeding
    - Intermenstrual bleeding
- LMP

13. Marietal status:

14. Obstetric history

- Para /Living /Abortion /Died
- H/o.Spontaneous Abortion/Premature Delivery/ IUD
- Last Delivery

15. Coital history

    - H/o Dyspareunia-superficial/'deep
    - Act once in how many days
    - Orgasm achieved / not
    - Use of contraceptive methods —

      OCPS/IUCDS/Barrier methods/Others

16. Past history
    - H/o Tuberculosis
    - H/o Dilatation and Curettage /Electrocautery/other treatment for cervical lesion
    - H/o STD
    - H/o DM/Thyroid Disease/HT

17. Family history
    - HT/DM/TB/obesity

18. Personal history
    - Bladder disturbances — Dysuria/increased freq./burning micturition/ others
    - Habits —smoking / drinking

19. Previous management of infertility

20. General physical examination
    - Built — Asthenic / Average / Obese
    - Breast
    - Thyroid
    - Features of Hirsutism

21. Systemic examination

    - CVS
    - Respiratory
    - CNS

22. Per abdomen

    - Obesity
    - Mass per abdomen
    - Others

23. Per speculum

    External Genitalia

    Vagina - Normal/Growth/Congested

    White discharges - Thick curdy /Frothy white / Greenish / Mixed

    Cervix - Erosion/Cervicitis/Polyp/Descent/ Hypertrophy

24. Per vagina

    - Uterine position — Anteverted / Retroverted /Mid position
    - Uterine size — Normal/Atrophic/Bulky/Mass
    - Uterine mobility — Mobile/Restricted

- Forniceal tenderness — Present — ant / post / rt lat / Lt lat , Absent
- Adnexal mass — Present — Right/Left , absent

25. Investigation

- Urine routine.
- Hb%.
- RBS , Blood urea , Serum Creatinine
- HIV / VDRL / HBsAg
- Hormonal study: FSH / LH /Thyroid profile / Prolactin / testosterone
- Semen analysis
- USG
- **Laparoscopic Findings**

UTERUS	**FALLOPIAN TUBE**	**OVARY**	**OTHERS**
Anteverted	Normal	Normal	Tubo peritoneal factor
Retroverted	u/l patent	Streak	Endometriosis
Normal size	b/l patent	Enlarged	Pelvic adhesions
Bulky	u/l hydrosalpinx	Pcos	Tuberculosis
Hypoplastic	b/l hydrosalpinx	Ovarian cyst	
Fibroid	Hypoplastic	Chocolate cyst	
Anomalies	T O mass	Follicular cyst	
Fixed retroversion	u/l cornual block	Ovulatory signs	
	b/lcornual block		

Hysteroscopic findings

- Cervical canal
- Cavity
- Endometrium
- Ostia

INFORMATION SHEET

• We are conducting a study on "**A Clinical study of Diagnostic Hysterolaparoscopy as a tool in evaluation of female infertility**" among patients attending Rajiv Gandhi Government General Hospital, Chennai and for that your clinical details may be valuable to us.

• We are selecting certain patients and if you are found eligible, we may be using your clinical details in such a way so as to not affect your final report or management.

• The privacy of the patients in the research will be maintained throughout the study. In the event of any publication or presentation resulting from the research, no personally identifiable information will be shared.

• Taking part in this study is voluntary. You are free to decide whether to participate in this study or to withdraw at any time; your decision will not result in any loss of benefits to which you are otherwise entitled.

• The results of the special study may be intimated to you at the end of the study period or during the study if anything is found abnormal which may aid in the management or treatment.

Signature of investigator

Signature of participant

Date:

CONSENT FORM

STUDY TITLE:

"A CLINICAL STUDY OF DIAGNOSTIC HYSTEROLAPAROSCOPY AS A TOOL IN EVALUATION OF FEMALE INFERTILITY"

STUDY CENTRE :Institute of Social Obstetrics, Govt. KasturiBai Gandhi Hospital, Chennai.

PARTICIPANT NAME : **AGE:** **SEX:** **I.P.NO.**

I confirm that I have understood the purpose of procedure for the above study, I have the opportunity to ask the question and all my questions and doubts have been answered to my satisfaction.

I have been explained about the possible complications that may occur during the procedure, I understand that my participation in the study is voluntary and that I am free to withdraw at any time without giving any reason.

I understand that investigator, regulatory authorities and the ethics committee will not need my permission to look at my health records both in respect to the current study and any further research that may be conducted in relation to it, even if I withdraw from the study. I understand that my identity will not be revealed in any information released to third parties of published, unless as required under the law. I agree not to restrict the use of any or results that arise from the study.

I hereby consent to participate in " **A CLINICAL STUDY OF DIAGNOSTIC HYSTEROLAPAROSCOPY AS A TOOL IN EVALUATION OF FEMALE INFERTILITY"**

Signature of Investigator: Place :

Date :

Study Investigators Name Institution

Signature / Thumb Impression of patient

MASTER CHART

s.no	Name	Age	1*/2*	Duration	M/H	Parity	O/H	BMI	P/V	USG	Laparoscopy													Hysteroscopy		Diagnosis
											Uterus			Tubes				Ovaries				Others					
											Normal	fibroid	anomaly	Patent	B/L Block	U/I Block	Hydrosal	Normal	T/O Mass	PCOS	Cyst	Endometrosis	adhesion	TB	Normal	E.cavity	
1	Kalyani	32	2	9	1	A2	4	1	1	1	1			1				1								4	Intrauterine adhesion
2	Shuba	26	1	5	1	P0		2	1	1	1				2			1							1		B/Ltubalblock
3	Sangeetha	33	2	8	1	P1	1	1	1	1	1				2			1							1		B/Ltubalblock
4	Harija	24	1	8	1	P0		1	1	1	1			1				1							1		unexplained
5	Lavanya	32	1	10	1	P0		1	1	1	1				2			1							1		B/Ltubalblock
6	Anjali	27	2	6	2	A1	3	1	1	5	1				2		4	1							1		B/Ltubalblock,hydrosalphinx
7	Ammu	24	1	4	1	P0		2	1	1	1			1				1							1		unexplained
8	Panchavarnam	28	1	3	1	P0		1	1	1	1					3		1							1		U/Ltubalblock
9	Sivagami	35	1	5	1	P0		1	1	1	1				2			1							1		B/Ltubalblock
10	rani	30	1	6	1	P0		1	2	1	1				2			1							1		B/Ltubalblock
11	renuka	32	1	10	1	P0		1	1	1	1			1				1								5	subseptateuterus
12	balamani	36	1	9	2	P0		1	1	1	1				2			1							1		B/Ltubalblock
13	kokila	25	2	4	4	A2	4	1	1	5	1				2		4	1							1		B/Ltubalblock,hydrosalphinx
14	banumathy	24	1	2	1	P0		1	1	1	1					3		1							1		U/Ltubalblock
15	saraswathy	39	2	13	3	P1	1	1	1	2	1			1						3					1		Pcos
16	karpagavalli	32	1	9	1	P0		1	1	1	1				2			1							1		B/Ltubalblock
17	dilsath begam	25	2	5	1	A1	3	1	1	1	1			1				1							1		unexplained
18	divya	26	1	4	1	P0		1	1	1	1			1				1									unexplained
19	boomilatha	34	2	8	1	A2	4	1	1	1	1			1				1					2		1		peritonealadhesion
20	valli	24	1	4	1	P0		1	1	1	1				2			1							1		B/Ltubalblock
21	shanthi	24	1	5	1	P0		2	1	1	1			1				1							1		unexplained
22	jeyanthi	28	1	3	1	P0		1	3	1	1			1				1							1		unexplained
23	banu	30	1	5	1	P0		1	1	1	1			1				1							1		unexplained

24	valarmathi	35	1	11	2	P0		2	1	2	1			1						3					1		PCOS
25	vasanthi	29	1	3	3	p0		1	1	3	1				2						4				1		B/Ltubalblock,rt.ovariancyst
26	sathya	29	1	3	1	p0		1	1	1	1				2			1							1		B/Ltubalblock
27	jarcina	40	1	16	1	P0		1	1	4		2		1				1							1		fibroid
28	Lakshmi	29	2	7	1	A2	4	2	1	3	1				2						4				1		B/Ltubalblock,rt.ovariancyst
29	savitha	29	2	4	1	P1	2	1	1	1	1				2			1					2		1		B/Ltubalblock,adhesion
30	hazina	32	1	5	1	P0		1	1	1	1				2			1							1		B/Ltubalblock
31	neela	39	2	16	2	P1	1	2	1	2	1			1						3					1		PCOS
32	eswari	35	2	12	1	A1	3	1	1	1	1					3		1							1		U/Ltubalblock
33	sangeetha	26	1	2	1	P0		1	1	1	1			1				1							1		unexplained
34	sakila	28	1	2	1	P0		1	1	1	1			1				1								5	subseptateuterus
35	shameena	33	2	6	1	P1	1	1	1	1	1					3		1							1		U/Ltubalblock
36	chitra	30	1	3	3	P0		1	2	4		2		1				1								2	fibroid,submucousfibroid
37	thilagavathy	26	1	4	1	P0		2	1	2	1			1						3					1		Pcos
38	radhina	31	1	2	1	P0		1	1	1	1					3		1							1		U/Ltubalblock
39	krishnaveni	32	1	11	1	P0		1	1	1	1			1				1							1		unexplained
40	saritha	27	1	3	1	p0		1	3	1	1			1				1							1		unexplained
41	latha	28	1	2	3	p0		2	1	2	1			1						3					1		PCOS
42	jayanthi	25	2	2	2	p1	1	2	1	2	1			1						3					1		PCOS
43	sharmila	27	1	4	1	P0		2	1	1	1					3		1							1		U/Ltubalblock
44	soniya	24	1	4	1	P0		1	1	1	1					3		1							1		U/Ltubalblock
45	valli	25	1	5	2	P0		1	1	2	1			1						3					1		PCOS
46	parameshwari	32	1	6	2	P0		2	1	2	1			1						3					1		PCOS
47	rani	33	1	12	1	P0		1	1	3	1					3					4				1		U/Ltubalblock,ovariancyst
48	Chitra	28	1	4	1	P0		1	1	1	1					3		1							1		U/Ltubalblock
49	syedaleema	24	1	3	3	P0		2	1	2	1			1						3					1		PCOS
50	jayasri	29	1	4	1	P0		1	1	1	1			1				1							1		unexplained
51	saleema	30	1	5	3	P0		1	1	4		2		1				1								2	fibroid,submucousfibroid
52	fowsiya	32	1	7	1	P0		1	1	1	1			1				1							1		unexplained
53	mahalakshmi	36	1	5	1	P0		2	2	4		2		1				1								2	fibroid,submucousfibroid
54	thenmozhi	29	2	6	1	P1	2	1	1	1	1				2			1							1		B/Ltubalblock
55	bujji	32	1	4	1	P0		1	1	1	1			1				1							1		unexplained

56	monisha	34	2	8	1	P1	1	2	1	2	1				2					3					1		B/Ltubalblock,pcos
57	rajeshwari	28	1	4	1	P0		1	1	5	1					3	4	1							1		U/Ltubalblock,hydrosalphinx
58	kumari	25	1	4	2	P0		2	1	2	1			1						3					1		PCOS
59	jayalakshmi	29	1	6	1	P0		1	1	4		2		1				1								3	fibroid,submucouspolyp
60	jayakumari	32	2	8	1	P1	1	1	1	1	1				2			1							1		B/Ltubalblock
61	parveen banu	32	2	5	1	P1	2	2	1	5	1					3	4	1							1		U/Ltubalblock,hydrosalphinx
62	kavitha	37	1	13	1	P0		2	2	4		2		1				1							1		fibroid
63	devi	33	1	4	1	P0		1	1	1	1			1				1							1		unexplained
64	sarala	28	1	6	4	P0		2	1	1	1			1				1							1	2	submucosal fibroid
65	saraswathy	22	1	3	2	P0		2	1	2	1			1						3					1		PCOS
66	nagalakshmi	33	1	12	1	P0		1	1	4		2		1				1							1		fibroid
67	santhi	32	1	9	2	P0		1	1	1	1			1				1							1		unexplained
68	amudha	22	1	3	1	P0		1	1	1	1			1				1							1		unexplained
69	jayanthi	29	2	6	1	A1	3	1	1	4		2		1				1								2	fibroid,submucousfibroid
70	shanthi raja	38	1	14	4	P0		1	1	1	1				2			1				1			1		B/Ltubalblock,endometriosis
71	mesherinmary	28	1	7	1	P0		1	1	1	1			1				1							1		unexplained
72	amala	26	1	4	1	P0		1	3	3	1			1							4				1		rt.ovariancyst
73	vetriselvi	29	1	6	3	P0		1	1	1	1			1				1								3	submucouspolyp
74	ajima	34	1	13	1	P0		1	1	1	1			1				1				1			1		endometriosis
75	ambika	28	1	3	1	P0		1	1	1	1			1				1							1		unexplained
76	amala	27	1	2	2	P0		2	1	2	1			1						3					1		PCOS
77	mageshwari	24	1	3	2	P0		2	1	2	1			1						3					1		PCOS
78	shanthi	25	1	4	1	P0		1	3	3	1			1							4				1		rt.ovariancyst
79	sangeetha	29	1	6	1	P0		1	1	1	1			1				1				1			1		endometriosis
80	ezhizabathrani	23	1	5	1	P0		1	1	1	1					3		1					2		1		adhesion,U/Ltubalblock
81	jayanthi/s	30	2	7	1	A1	3	2	1	1	1			1				1								3	submucouspolyp
82	sarala	30	1	4	1	P0		2	1	2	1			1						3					1		PCOS
83	saraswathy	29	1	6	1	P0		1	1	1			4	1				1								7	Bicornuate uterus
84	jayapriya	28	2	7	1	A2	4	1	1	3	1			1							4				1		rt.ovariancyst
85	shabeenabanu	29	2	6	1	P1	1	2	3	3	1			1					2						1		lt.tuboovarian mass
86	kavitha	22	1	3	1	P0		1	1	1	1			1				1								6	septateuterus
87	murugeshwari	30	1	4	3	P0		2	1	2	1			1						3					1		PCOS

88	kaliammal	25	1	3	1	P0		1	1	3	1			1					2						1		lt.tuboovarian mass
89	abirami	31	2	5	1	P1	2	1	1	1	1			1				1					2		1		Adhesion (PID)
90	Divya/balu	25	2	4	1	P1	2	1	1	1	1			1							4	1			1		Endometriosis lt ovaian cyst
91	kokilavani	29	1	6	1	P0		1	1	1	1			1				1							1		unexplained
92	valliyammal	23	1	2	1	P0		2	1	2	1			1						3					1		Pcos
93	banupriya	32	2	7	4	P1	1	1	1	1	1			1							4	1			1		endometriosis ,ovarian cyst
94	hazeerabegam	24	1	3	1	P0		1	1	1	1			1				1							1		unexplained
95	jayavani	32	2	5	1	A2	4	1	1	1	1					3		1					2		1		adhesion,U/Ltuballblock
96	banumathy	22	1	4	3	P0		2	1	2	1			1						3					1		PCOS
97	fathima	29	1	4	1	P0		2	1	1	1			1				1								2	submucosal fibroid
98	rajeshwari	24	1	2	1	P0		1	1	1	1			1				1							1		unexplained
99	fousiyabanu	33	2	5	1	P1	2	1	1	3	1			1							4				1		lt.ovariancyat
100	rajathi	35	2	8	1	P1	2	1	1	1	1			1				1				1			1		endometriosis

KEY TO MASTER CHART

1*- PRIMARY

2* - SECONDARY

Laparoscopy findings;

Uterus-

1- Normal
2- Fibroid
3- Arcuate uterus
4- Bicornuate uterus

Fallopian tube.

1-B/l patent

2-B/l block

3-U/l block.

4-Hydrosalphinx.

Ovaries.

1-Normal

2-Tuboovarian mass

3-B/l pcos

4- Ovarian cyst.

Peritoneal factors;.

1-Endometriosis

2-Adhesions

3. Infection.

Hysteroscopy findings;

1-Normal

2-Sub mucous fibroid

3-Submucous polyp

4-Intra uterine adhesions

5-Subseptate uterus

6-Septate uterus

7-Bicornuate uterus

Obstetric history in secondary infertility:

1. Vaginal delivery
2. LSCS
3. Previous one miscarriage
4. Previous two miscarriage

Menstrual history:

1. Regular
2. Oligomenorrhea
3. Menorrhagia
4. Poly menorrhea

Bodymass index(BMI):

1. Normal
2. Obesity

Vaginal examination:

1. Normal
2. Bulky uterus
3. Adnexal mass

USG findings;

1.Normal
2.PCOS
3.Ovarian cyst
4.Fibroid uterus
5.Adnexal mass

INSTITUTIONAL ETHICS COMMITTEE
MADRAS MEDICAL COLLEGE, CHENNAI-3

EC Reg No.ECR/270/Inst./TN/2013
Telephone No : 044 25305301
Fax : 044 25363970

CERTIFICATE OF APPROVAL

To
Dr. K. Ambika,
PG in Obstetrics & Gynaecology,
ISO KGH, Triplicane,
Chennai-5.

Dear Dr. K. Ambika,

The Institutional Ethics Committee of Madras Medical College, reviewed and discussed your application for approval of the proposal entitled **"A clinical study of Diagnostic Hysterolaparoscopy as a tool in Evaluation of Female Infertility"** No.17032014

The following members of Ethics Committee were present in the meeting held on 11.03.2014 conducted at Madras Medical College, Chennai-3.

1.	Dr. C. Rajendran, M.D.	-- Chairperson
2.	Dr. R. Vimala, M.D. Dean, MMC, Ch-3.	-- Deputy Chairperson
3.	Prof. Kalaiselvi, MD Vice-Principal, MMC, Ch-3	-- Member Secretary
4.	Prof. Nandhini, M.D. Inst. of Pharmacology, MMC, Ch-3.	-- Member
5.	Prof. Bhavani Shankar, M.S. Prof & HOD of General Surgery, MMC, Ch-3.	-- Member
6.	Prof. V. Padmavathi, M.D. I/c Director of Pathology, MMC, Ch-3.	-- Member
7.	Thiru. S. Govindasamy, BABL	-- Lawyer
8.	Tmt. Arnold Saulina, MA MSW	-- Social Scientist
9.	Thiru. S. Ramesh Kumar, Administrative Officer, MMC, Ch-3.	-- Layperson

We approve the proposal to be conducted in its presented form.

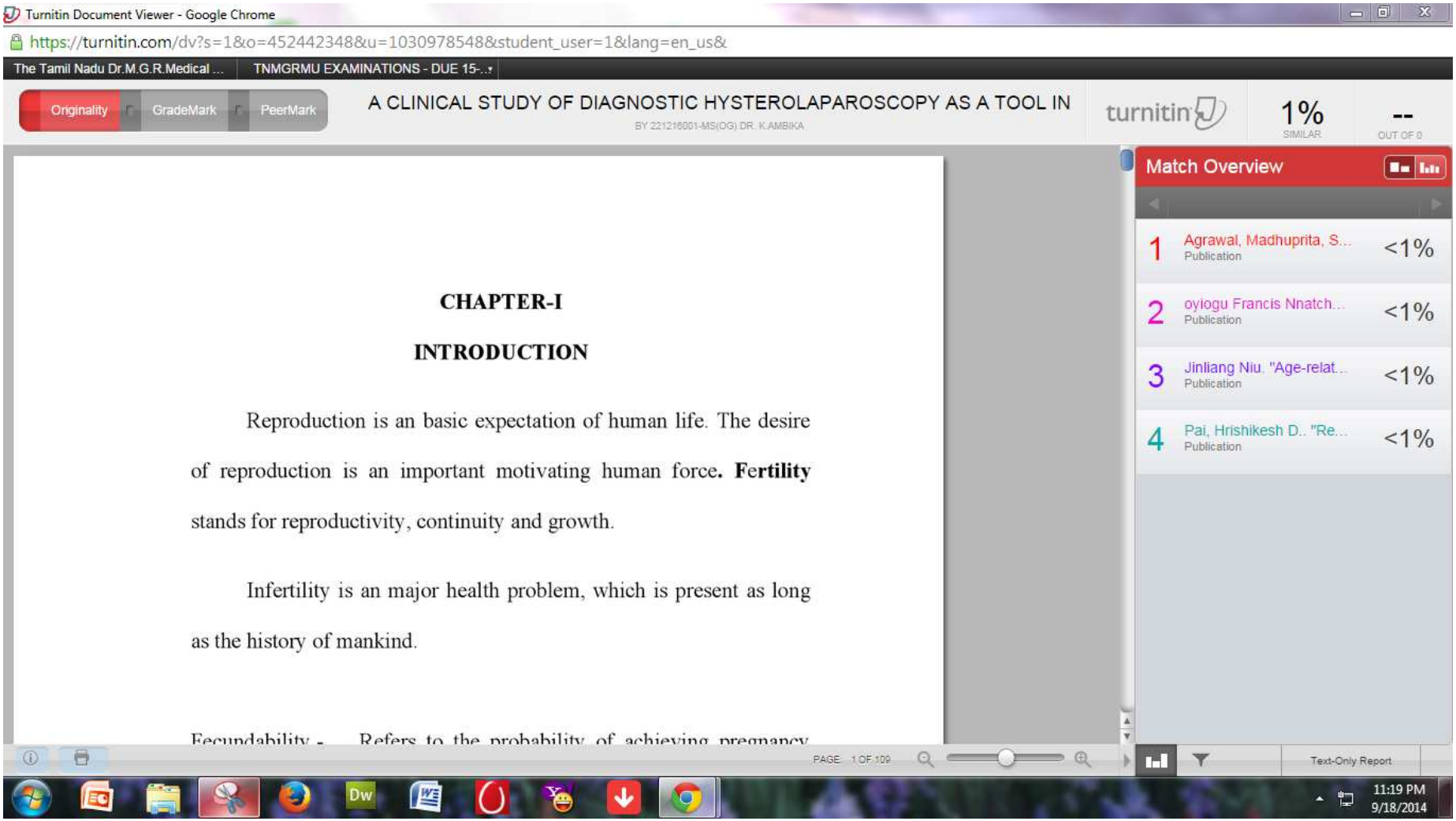
Sd/Chairman & Other Members

The Institutional Ethics Committee expects to be informed about the progress of the study, and SAE occurring in the course of the study, any changes in the protocol and patients information / informed consent and asks to be provided a copy of the final report.

13/3/14

MEMBER SECRETARY
MADRAS MEDICAL COLLEGE
CHENNAI-600 003

Member Secretary, Ethics Committee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CHAPTER-I
INTRODUCTION
Reproduction is an basic expectation of human life. The desire of reproduction is an important motivating human force. Fertility stands for reproductivity, continuity and growth.
Infertility is an major health problem, which is present as long as the history of mankind.
Fecundability - Refers to the probability of achieving pregnancy
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